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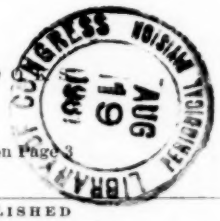

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ON VACCINE THERAPY AND IMMUNISATION IN VITRO.

By Sir Almroth Wright, K.B.E., C.B., M.D., D.Sc. Dub., F.R.S.,

PRINCIPAL OF THE INSTITUTE OF PATHOLOGY AND RESEARCH, ST. MARY'S HOSPITAL; PROFESSOR OF EXPERIMENTAL PATHOLOGY IN THE UNIVERSITY OF LONDON.

(*Continued from p. 230.*)

Antibacterial Power of Blood.

I accordingly set myself to devise methods for measuring, first, the hæmobactericidal power exerted by the blood and its population of leucocytes upon serophytic organisms such as the staphylococcus, streptococcus, pneumococcus, and the tubercle bacillus. The problem I set myself here was to find, not a method of explantation to tell us what number of serophytic microbes are killed off without residue, but a method of inculturing to tell us what percentage of enumerated microbes implanted would grow out into colonies in the blood. The reason why the one and not the other kind of method is required to measure the effect exerted by the blood by serophytes will presently be apparent.

The slide cell method which makes use of defibrinated blood was one of the methods of inculturing devised for this purpose. It is illustrated in Figs. 1 and 4, and is one of the methods put to use by Fleming in his experiments on the action of antiseptics.

A second method devised for the same purpose is the following:

> Graduated implantations of microbes are made into uncoagulated instead of into defibrinated blood, and the implanted blood volumes are then drawn up into capillary tubes. After overnight incubation the capillary clots are blown out, are treated with 1 per cent. saponin, and are then hung up in water until their colour is completely discharged. They are then dried and stained, and the colonies are enumerated under the microscope.

This, of course, gives—in particular in the case when the colonies are close-packed—a more accurate enumeration than the naked-eye observation which we trust to in the slide-cell method. It also gives us indications as to the rôle which phagocytosis plays in the killing of microbes. For the colonies found in the clots can be ranged into three classes: *naked colonies*—i.e., those which are not surrounded by leucocytes; *ringed colonies*, colonies surrounded with leucocytes; and what we may call blind, blank, or *obliterated colonies*—i.e., aggregations of leucocytes surrounding a presumably extirpated bacterial colony.

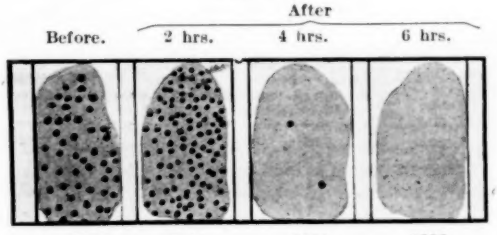
A third method—and this differs from the second only in the mode of implantation—is the "wash and afterwash" method. Here we draw up into a long capillary tube, first as a forerunner, a diluted bacterial culture, and then follow on with 10 equal volumes of blood separated off in each case by a bubble of air.

I will now relate what these methods have taught us about immunisation and the killing of serophytic microbes by the blood. Let me first explain the following points:

To begin with, the normal serum constitutes a very excellent culture medium for the class of microbes we are here considering. The same holds of the plasma. This, since the plasma is always full of blood-platelets, means incidentally that these formed elements also can here be dismissed from consideration. Further, the red corpuscles can, in appraising the bactericidal powers of the blood, be neglected. That follows by the fact that deleucocyted blood—i.e., the mixture of red corpuscles and serum which is obtained by passing blood through a close filter[12]—is as good a culture medium for serophytes as clear serum. It follows from this galaxy of premises that the bactericidal action which is exerted by a blood upon serophytic microbes is neither more nor less than the bactericidal action exerted by its population of leucocytes.

The next issue which comes up in connexion with the killing of serophytes by leucocytes is that as to whether these microbes are killed exclusively by phagocytosis followed by intracellular digestion; or whether they are killed also, and if so to what extent, extracellularly by bactericidal elements elaborated by the leucocytes and excreted by them into the serum.

Fig. 4.



Coli vaccine, 280 millions (intravenously). Tested in a slide cell by implanting 225 streptococci into 50 c.mm. of blood.

Important data which have, as we shall see later, a bearing upon this question, are furnished by a study of the event of adding graduated quanta of serophytic microbes to equal volumes of blood.

FUNDAMENTAL EXPERIMENTS.

I have already published experiments bearing on this question. But it will be convenient to give a concrete illustration of what happens when my blood (it is a blood of somewhat low staphylobactericidal power) is implanted with different quanta of staphylococcus. I subjoin protocols of two typical experiments confining myself for the moment to experiments carried out in slide cells.

Expt. 27.7.22.—Forty c.mm. volumes of A. E. W.'s defibrinated blood implanted with different quanta of staphylococcus culture and cultured in slide cells. (Table I.)

Expt. 1.8.22.—Graduated dilutions of staphylococcus culture were implanted into measured volumes of A. E. W.'s blood. The blood was then tested by two observers. (Table II.)

The explanation of the fact that the implanted microbes are here in no instance killed off without residue is furnished by the consideration that extracellular killing involves close proximity, and phagocytosis actual contact, between the microbes and leucocytes. In connexion with these requisites attention must be given to the following series of facts: (1) there are always in the blood large areas unoccupied by leucocytes (the volume of the contained leucocytes stands to the volume of the containing

[12] Wright, A. E.: The Lancet, 1926, i., 4.; Fleming, A.: Brit. Jour. Exper. Path., 1926, vii., 281.

blood in the ratio of about 1 to 300); (2) these regions are for the major part leucocytically unpatrolled or very ineffectively patrolled; and (3) since it can, by appropriate experiments, be shown that leucocytes are

TABLE I.

Approximate number of staphylococci implanted.*		No. of colonies which developed.	Percentage of microbes that survived.
Per c.cm.	Per 40 c.mm.		
6,400	256	95, 96 } 95½	39
3,200	128	57, 53 } 55	43
1,600	64	34, 26 } 30	47
800	32	19, 11 } 15	46
400	16	11, 12 } 11½	72

* The number of microbes implanted was here and in all the experiments which follow deduced from the number of microbes which grew out into colonies in serum.

TABLE II.

Observer A. E. W.

Implantation per c.cm. of blood.	No. of microbes implanted into 40 c.mm. of blood.	No. of microbes which developed into colonies.	Percentage of survivors.	
8,400	336	64	19	
4,200	168	28	17	
2,100	84	24	28	21·2
1,050	42	7·5	18	
525	21	11·5	55	
262	10½	5	50	
131	5	5		140
66	3	7		
33	1·5	1·5		
	671	153	22·8	

Observer L. C.

9,600	384	74	19	
4,800	192	44	23	
2,400	96	27	28	23·7
1,200	48	13	27	
600	24	15	63	
300	12	6	50	
150	6	5		114
75	3	5		
38	1·5	2		
	766	191	24·9	

insensitive to the feeble chemotatic stimuli which emanate from single microbes, the finding of isolated leucocytes by microbes must—even in patrolled areas in the blood—be a matter of chance. In other words, it depends upon the microbe happening to lie directly in the path taken by the leucocyte.

The fact that with larger and larger implantations larger and larger numbers of microbes are killed, shows that the blood develops under the impulsion of microbic stimulation increased bactericidal power.

INTERPRETATION OF THE DATA.

From this then follows the important principle that our methods of hæmobactericidal measurement are not in the same category as quantitative chemical tests. They are, in reality, biological tests; tests which tell us not what amount of bactericidal energy is actually resident in a sample of blood, but what bactericidal energy can, under the impulsion of microbic stimulation, be developed in that blood. In other words, they are comparable to tests made to find out what amount of muscular power can, under stimulation, be put forth by a muscle.

It is pertinent to note in passing that the general principle of which we have illustration here may hold true, not only of bactericidal, but also of opsonic power. It is conceivable that the values for opsonic power which are registered when microbes are incubated with a mixture of serum and leucocytes may represent, not as hitherto assumed, the native opsonic power of the serum, but native opsonic power supplemented by opsonins excreted into the serum by leucocytes under the impulsion of a microbic stimulus. Experimental data which bear upon this question will come up for consideration later. For the moment it will suffice to point out that by centrifugalising instead of incubating a phagocytic mixture, and by conducting our phagocytic operations at the temperature of the air instead of at blood heat, we can reduce the exposure of the leucocytes to microbic stimulation to a minimum.[13]

The Immunising Response.

Now that our measurements of the bactericidal power of the blood have brought us face to face with the conception of immunising response to the inoculation of microbes into the blood in vitro it will be appropriate to explain the genesis of that idea.

My first experiments on the question of immunising response made by the blood were prompted by the fact already mentioned that we had, despite strenuous experimental search, failed to find any indication of the production of antibacterial substances by the fixed tissues. In view of that I performed the following experiment:—

Having placed double ligatures loosely round the jugular vein of a rabbit and having tied off all tributaries, vaccine was introduced into the vein of the opposite ear, and thereupon the double ligatures were drawn tight so as to isolate a portion of the vaccinated blood within the jugular vein. At the same time a sample of the vaccinated blood was withdrawn from the carotid and was placed in the incubator.

Experiments of this kind showed that the antibacterial response was obtained, not only in the circulating blood, but also in the blood isolated in the vein; and in addition in the blood which was isolated and incubated in vitro.

These experiments were followed by others in which graduated doses of a staphylococcus and also of a streptococcus vaccine were added to my own blood in vitro. The inoculated samples of blood were then incubated for six hours and afterwards the sera were pipetted off, and then using the "wash and afterwash" procedure 10 volumes of each serum were implanted with a mixture of staphylococci and streptococci. The separate volumes of serum in question were then, after overnight incubation, explanted upon agar. These experiments showed (*a*) that the serum of blood implanted with an appropriate dose of a staphylococcus or streptococcus vaccine becomes bactericidal to both species of microbe; and, further (*b*) that the sera of the bloods implanted with an overdose of vaccine furnish, as compared with the serum of the uninoculated blood, a more favourable culture medium for both kinds of microbe.

The next important step undertaken—but this had to wait until the slide cell and other hæmobactericidal methods had been devised—was to investigate, as we have just done, the effect of adding graduated quanta of serophytic microbes to the blood.

IMMUNISING RESPONSE IN VITRO.

I have now, for 12 and more years, experimented continuously upon the immunising response of blood in vitro.

In addition to examining for augmented and

[13] Fleming: On Wright's Centrifuge Method of Estimating Phagocytosis, Brit. Exp. Path., 1927, viii., 50.

reduced bactericidal power in the blood taken as a whole, I have analysed the results which relate to this by chiastic bactericidal experiments. Further, I have searched for augmented and reduced bactericidal power in the serum—I use here the term reduced as well as the term augmented for the reason that the normal serum, though it is as good a culture medium for staphylococci as nutrient broth, furnishes, there is reason to think, less than 100 colonies for 100 implanted staphylococci. I have further looked for increased and decreased phagocytic response; for increased and diminished opsonic power; and for negative and positive changes in the phagocytic avidity of the leucocytes—keeping in view all the time the problem of the rôle played by each of these items in the general bactericidal power of the blood.

I have employed also as antigens, both living and dead, and in some cases, autolysed microbes, testing the resulting immunising response upon both homologous and heterologous cultures.

Moreover, I have experimented upon the blood before clotting, upon coagulated blood, upon defibrinated blood, and upon isolated leucocytes—either leucocytes which had emigrated from the blood, or leucocytes separated by centrifugalisation.

Again, I have brought living or dead vaccines into operation sometimes by incorporating them into the blood; and at other times by placing a blood containing vaccine upon or side by side with a blood containing a test-quantum of microbes (*Method of Welded Clots*); and, finally, I have—and this is also an effective method of vaccination—inoculated the leucocytes intracellularly. The procedure here in question (I call it the '*baiting method*') consists in taking two samples of blood, giving the leucocytes in one sample, a somewhat sparse phagocytic meal of microbes; and then supplying, after an interval of incubation, both the fed and the unfed populations of leucocytes with a full phagocytic test-meal.

In view of the wide domain covered by these experiments, I must confine myself to setting out here only the most important experimental findings.

Let me begin with the results of the chiastic experiments.

Expt. I., 29.8.23.—Simple bactericidal experiment in slide cells and also chiastic experiment. (Observer—L. C.). (Tables III. and IV.).

TABLE III.—*Hæmobactericidal Experiment.*

Tests of samples of blood before and after inoculation in vivo.

No. of staphylococci implanted	747	249	83
	No. of colonies which developed.		
Blood A	13	5	1
Blood B	4	4	2

TABLE IV.—*Chiastic Slide Cell Bactericidal Tests.*

No. of staphylococci implanted	420	140
	No. of colonies which developed.	
Corpuscles of Blood—		
(A) with serum of Blood (A)	27	11
(B) ,, ,, (B)	9	2·5
(A) ,, ,, (B)	16·5	9·5
(B) ,, ,, (A)	8·5	5·0

Blood B.—Index of hæmobactericidal efficiency 3·3; index of the bactericidal efficiency of the serum, 1·45; index of bactericidal efficiency of the leucocytes, 2·8.

Female student inoculated with 1000 million staphylococci subcutaneously. Blood A taken before the inoculation; Blood B four hours after. Both bloods were tested with three different suspensions of staphylococcus—2·5 c.mm. of each being added in each case to 50 c.mm. of blood.

Expt. II.—Inoculation in vitro.—A 100 c.cm. volume of R. T. M.'s unvaccinated defibrinated blood, and also a 100 c.mm. volume of his blood vaccinated with 1,000,000 of dead staphylococci per c.cm. The bloods were then incubated for one hour. After that the sera were pipetted off and the corpuscles washed in saline. Then in each case one volume of washed corpuscles was mixed with one volume of serum, and then 50 c.mm. volumes of each mixture were implanted with one-twentieth volume of graduated dilutions of staphylococcus culture. The implanted bloods were then cultivated in slide cells. (Table V.).

TABLE V.—*Chiastic Slide Cell Bactericidal Tests.*

No. of staphylococci implanted ..	736	368	184	92	66
	No of colonies which developed.				Total.
Serum and corpuscles of Normal blood ..	25	12	5	4	46
Serum and corpuscles of Vaccinated ,, ..	36	19	9	7	71
Serum of normal and corpuscles of vaccinated blood	54	20	15	6	95
Serum of vaccinated and corpuscles of normal blood	12	6	3	2	23

Vaccinated Blood.—Index of hæmobactericidal efficiency, 0·64; index of the bactericidal efficiency of the serum, 2; index of the bactericidal efficiency of the leucocytes, 0·5.

The results, you will see, of these experiments are inconclusive as to the relative importance of the part played by the leucocytes and the serum in the general bactericidal effect.

I must therefore pass on to other experiments. And let me, in order that these may be followed properly, point out that the number of serophytic microbes killed by the blood is determined largely by the disposition of the population of leucocytes relative to the population of microbes, and this disposition is, of course, modified by every physical force that comes into operation upon the blood.

The forces which here require to be considered are: (*a*) the force of gravity; (*b*) the compressional force exerted by the contraction of the clot; (*c*) the effect of centrifugalisation respectively upon uncoagulated, defibrinated, and coagulated blood; and (*d*) the spontaneous movements of the leucocytes.

With regard to the effect of gravity this comes into consideration in particular when we are operating with defibrinated blood. For here the red corpuscles and leucocytes settle to the bottom; and the microbes are left floating in the supernatant serum. They are there safe from phagocytic attack, and can, if the serum continues to be non-bactericidal there develop into colonies.

The spontaneous contraction of the clot influences the results by bringing closer together the leucocytes and microbes which were in the unclotted and freshly clotted blood comparatively far apart. In connexion with this it will be recalled that half the volume of blood consists of fluid—and that this in the unretracted clot forms pools in which the microbes are, as in the supernatant serum of defibrinated blood, safe from phagocytic attack. The degree to which an individual clot is compacted by the spontaneous retraction of the fibrin meshwork depends, of course, upon all sorts of variable and incalculable factors.

Centrifugalisation—we may consider first the centrifuging of uncoagulated or defibrinated blood—altogether alters the distribution of the leucocytes in those bloods. When uncoagulated blood is centrifuged the large mononuclear leucocytes and the

lymphocytes are brought to the surface, and are with a proportion of the blood-platelets agglomerated into a leucocytic cap. Most of the polynuclear leucocytes are assembled immediately underneath. When defibrinated blood is centrifuged for a long period (let us say, a quarter of an hour) in a high speed centrifuge, the polynuclear leucocytes are brought to the top. When microbes are implanted into serum or plasma or are implanted into blood which does not make immunising response, the microbes are not carried down in full proportion by ordinary centrifuging. Many are left in suspension in the supernatant fluid.

When a coagulated blood is centrifuged the clot is, of course, compacted, the lacunæ are abolished, and in the case of an implanted blood the microbes and leucocytes are brought into much closer proximity than in the uncompacted clot.

The results obtained by the centrifugalisation of implanted capillary clots furnish a striking manifestation of the influencing of the hæmobactericidal effect by mechanical factors.

Expt. 7.11.28. Comparison of Packed and Unpacked Blood and Slide Cells.—Four 50 c.mm. volumes of R. M. F.'s blood implanted with an 1800-fold and four others with a 600-fold dilution of staphylococcus, 2·5 c.mm. of staphylococcus dilution being added to each 50 c.mm. of blood. The implanted bloods were then filled into capillary tubes and were kept in the incubator for six minutes to allow time for clotting and for the separation of the clot. Then two tubes from each set of four were centrifuged for two minutes at full speed in the electric centrifuge. All the capillary tubes were then incubated for 18 hours. The clots were then decolorised and the anaerobic colonies in them were counted.

Four 50 c.mm. volumes of defibrinated blood to which the same addition of staphylococcus had been made were then cultured in slide cells. Higher dilutions of staphylococcus were enumerated in slide cells in watered blood. (Table VI.)

TABLE VI.

No. of staphylococci implanted	520	1560
	No. of colonies which developed.	
Defibrinated blood in slide cells	30, 52, 43, 46 } 43	93, 121, 114, 111 } 110
Unpacked capillary blood-clots	48, 40 } 44	124, 129 } 126½
Packed capillary blood-clots ..	4, 3 } 3½	11, 48 } 29½

Expt. 16.11.27.—Similar experiment and technique to above. (Table VII.)

TABLE VII.

—	Volume of staphylococcus implanted.		
	1/8 Wash.	¼ Wash.	½ Wash.
	No. of colonies which developed.		
Defibrinated blood in slide cells	48, 38 } 43	113, 108 } 111	∞, ∞ } ∞
Unpacked capillary blood-clots	15, 13 } 14	39, 65 } 52	149, 225 } 187
Packed capillary blood-clots ..	0, 2 } 1	0, 0 } 0	32, 16 } 24

Having got these preliminary matters out of our way we may consider the outcome of repeating the fundamental experiments, varying however the technique, in using here for our implantation instead of defibrinated blood or blood fresh from the circulation leucocytes derived from centrifuged blood suspended in serum. The following protocols of experiments show that we obtain when we operate with leucocytic suspensions exactly the same results as when we operate with the whole blood.

Expt. 31.10.30.—A. E. W.'s blood. Citrated blood was prepared by adding ½ per cent. of citrate of soda to 50 c.mm. volumes of blood. The blood samples were then centrifuged in capillary tubes and the plasma was pipetted off. The capillary tubes were now cut across immediately below the leucocytic cap and the agglomerated leucocytes dispersed in 30 c.mm. of serum. These serum suspensions of leucocytes were then implanted with, in each case, 5 c.mm. of a diluted staphylococcus culture, and were then incubated in capillary tubes disposed nearly horizontally. Similar quanta of staphylococcus were, for purposes of enumeration, implanted into leucocyte-free serum. (Table VIII.)

TABLE VIII.

Dilution of staphylococcus implanted.	No. of colonies which developed in a leucocyte-free serum.	No. of colonies which developed in the leucocytic suspension.	Percentage of survivors.
Staph. 100,000	8, 8 } 8	10, 8 } 9	100
Staph. 50,000	16, 17 } 16·5	2, 2 } 2	12
Staph. 25,000	33	6, 4 } 5	15·5

Expt. 7.11 30.—50 c.mm. volumes of R. H.'s blood were centrifuged after the addition of ½ per cent. citrate of soda. The plasma having been pipetted off the leucocytes composing the leucocytic cap were dispersed in 30 c.mm. of serum, and these suspensions were implanted with one-tenth of their volume of graduated dilutions of staphylococcus, and were then incubated in capillary tubes disposed nearly horizontally. (Table IX.)

TABLE IX.

Dilution of staphylococcus implanted.	No. of microbes implanted into each volume of leucocytic suspension.	No. of colonies which developed in each tube.	Percentage of survivors.
Staph. 200,000	25	1, 1 } 1	4
Staph. 100,000	50	0, 1 } 0·5	1
Staph. 50,000	100	1, 2 } 1·5	1·5
Staph. 2500	2000	9, 7 } 8	0·4

Expt. 5.11.30.—R. T. M.'s blood. Leucocytic suspension made by suspending the leucocytes from 50 c.mm. of centrifuged blood in 15 c.mm. of serum.

TABLE X.

No of microbes implanted.	No. of colonies which developed.	Percentage of survivors.
36	9, 12 } 10½	28
72	20, 18 } 19	26
144	18, 18 } 18	12
288	58, 30 } 44	15
576	60, 5 } 59	10

Expt. 3.12.30. R. M. F.'s blood.—Graduated implantations of staphylococcus into a weak leucocytic suspension. Leucocytic suspension prepared in bulk from R. M. F.'s citrated blood and diluted with serum to one-eighth standard: 2½ c.mm. volumes of staphylococcus dilutions were then implanted into 20 c.mm. of this leucocytic suspension—in triplicate and the suspensions were then incubated as above. Five counts made of 1/30,000 dilution in normal serum. (Table XI.)

We pass now to other experiments in which we employ, as before, graduated quanta of microbes,

and operate again upon blood or separated leucocytes; but we now arrange our experiments so that the acquirement of bactericidal power of the serum and the effect exerted by it shall be separately manifest.

The simplest and most obvious way of achieving this is to bring the vaccine of dead or living microbes into operation upon the blood, to incubate the clots, and then pipette off the serum and test it by implanting it with *very small* numbers of living microbes.

TABLE XI.

Dilution of staphylococcus.	Count.	Calculated implant.	Colonies developed.	Percentage of survivors.
Staph. 1000	—	720	246, 272 } 259	36
Staph. 3000	—	240	72, 90, 98 } 87	36
Staph. 10,000	—	72	32, 33, 22 } 29	40
Staph. 30,000	18, 29, 18, 30, 26	24	8, 6, 22 } 8	33
Staph. 100,000	—	7	5, 6, 7 } 6	86

Similar experiment and technique as above, 4.12.30.

Staph. 10,000	91, 81, 103, 93, 78	89	6, 3, 12, 4 } 6½	7
Staph. 20,000	—	44	8, 6, 8, 4 } 6½	14·8
Staph. 40,000	20, 14, 24, 32	22½	4, 5, 2, 15 } 6½	29
Staph. 80,000	—	11	1, 6, 3, 5 } 3½	34
Staph. 160,000	—	6	3, 3, 2, 1 } 2½	37·5

The two following experiments are of this kind:—

Expt. 17.12.30. A. E. W.'s blood.—5 c.mm. of salt solution or diluted staphylococcus culture were incorporated into 50 c.mm. volumes of blood, and the bloods were then incubated for 20 minutes. After this they were centrifuged and the sera pipetted off and tested by the Wash and Afterwash method—the forerunner volume being here a 10 c.mm. volume of $\frac{\text{Staph.}}{1000}$ and the after-runner volumes three 5 c.mm. volumes of serum. The results were as shown in Table XII.

TABLE XII.

—	No. of colonies which developed in the three after-runner volumes. 1	2	3	Total.
Serum from control blood ..	27, 26	20, 27	13, 15	60, 68 } 64
Serum from blood implanted with—				
320 staph. per c.cm. ..	30	25	13	68
640 staph. per c.cm. ..	30	24	1	55
1280 staph. per c.cm. ..	23	16	10	49
2560 staph. per c.cm. ..	18	12	0	30

Calculation shows that here, in the most favourable case, the 15 c.mm. of serum here used acquired sufficient bactericidal power to kill at the rate of 2500 staphylococci per c.cm.

Expt. 2.12.30. A. E. W.'s blood.—50 c.mm. volumes of blood centrifuged after clotting. The sera were drawn off and were, after addition of Tuberculin B.E., reimposed upon the clots. After 24 hours' incubation the sera were a second time drawn off, and were tested by the Wash and Afterwash method, using a 5 c.mm. volume of $\frac{\text{Staph.}}{1000}$ as a forerunner and three 5 c.mm. volumes of serum as after-runners. (Table XIII.)

TABLE XIII.

—	No. of colonies which developed in the three after-runner volumes. 1	2	3	Total.
Control normal serum ..	24, 34	15, 13	4, 6	43, 53 } 48
Serum containing—				
B.E.	13	7	4	24 } 27½
2000 million	21	6	4	31
B.E.	17	9	0	26 } 24
1000 million	14	8	0	22
B.E.	18	3	2	23 } 30
500 million	22	12	3	37
B.E.	13	2	0	15 } 16
100 million	9	4	4	17
B.E.	15	8	5	28 } 24½
50 million	16	5	0	21
B.E.	8	10	7	25 } 19½
25 million	9	3	2	14

Calculation shows that here again in the most favourable cases the serum acquires sufficient bactericidal power to kill just over 2000 staphylococci per c.cm.

Expt. 21.3.30.—100 c.mm. volumes of A. E. W.'s uncoagulated blood implanted with 10 c.mm. of normal salt solution or staphylococcus culture were incubated for 25 minutes, and then centrifuged. The sera were now pipetted off. 5 c.mm. volumes of a 50,000-fold diluted staphylococcus culture were added in each case to 40 c.mm. of serum. (Table XIV.)

TABLE XIV.

—	No. of colonies which developed.
Serum of control blood .. .. (1)	51
(2)	50
Serum from blood vaccinated with—	
5 staph. per c.c.	39
50 staph. per c.c.	15
500 staph. per c.c.	22
1,000 staph. per c.c.	17
2,000 staph. per c.c.	17
5,000 staph. per c.c.	12
20,000 staph. per c.c.	26

The serum here killed off, at the best, 950 staphylococci per c.cm.

Another way of studying the effect of the serum separately is illustrated by the next two experiments.

Expt. 9.12.30. A. E. W.'s blood.—50 c.mm. volumes of blood centrifuged after clotting in capillary tubes. The sera were then drawn off, 2·5 c.mm. of diluted staphylococcus culture were added to each volume of serum, and the sera were then replaced on the clots and lightly centrifuged. The containing tubes were then disposed almost horizontally and incubated overnight. (Table XV.)

TABLE XV.

Dilution of staphylococcus culture implanted.	No. of microbes implanted into each volume of serum.	No. of colonies which developed.	Percentage of survivors.
Staph. 160,000	6	6, 4 } 5	84
Staph. 80,000	12	2, 6 } 4	32
Staph. 40,000	25	9, 17 } 13	48
Staph. 20,000	50	21, 19 } 20	40
Staph. 10,000	100	55, 21 } 38	38

Calculation shows that here the serum in the most favourable case killed 2500 staphylococci per c.cm.

Expt. 23.9.30. A. E. W.'s blood.—50 c.mm. volumes were filled into capillary tubes and allowed to clot. They were then centrifuged and the sera pipetted off. The volumes of sera were then inoculated with Tuberculin B.E. and then implanted in each case with 58 staphylococci and replaced on the clots. The containing tubes were then sloped so as to form a small angle with the horizontal and were incubated in that position. The number of colonies which developed in the sera were then enumerated. (Table XVI.).

TABLE XVI.

—		No. of colonies which developed.
Control serum	(a) 52 (b) 52	52
Serum containing—		
B.E. / 2400 million	51 47	49
B.E. / 1200 million	42 41	41½
B.E. / 600 million	47 44	45½
B.E. / 300 million	35 37	36

Calculation shows that the serum killed 640 staphylococci per c.cm.

Yet another way of arranging the experiment (there is also a fourth, which will be considered elsewhere) is as follows:—

We take a series of capillary tubes upon the stems of which we have marked off two segments of, let us say, 25 c.mm. capacity. We then fill into the distal segments blood from the finger, incubate for 20 to 30 minutes and then expel the clots. Having thus provided ourselves with capillary tubes divided into two segments, of which the distal one is carpeted with leucocytes and the proximal one uncarpeted, we introduce into these combined segments through the proximal ends of the tubes in each case a 50 c.mm. volume of serum—the sera employed for the purpose having been implanted with graduated quanta of staphylococcus. The tubes are now sealed up without displacing the columns of serum, and, the unlined segments being kept uppermost, are sloped so as to form a small angle with the horizontal; they are then placed in the incubator. The protocols of two experiments of this kind are subjoined.

Expt. 2.1.31. R. M. F.'s blood. (Table XVII.)

TABLE XVII.

Dilution of staphylococcus culture implanted into the serum.	No. of microbes suspended in the serum in the		No. of colonies which developed in the serum in the		Percentage of survivors in unlined segment.
	Lined segment	Unlined segment	Lined segment	Unlined segment	
Staph. 180,000	12	12	0 0	15 7 } 11	90
Staph 90,000	24	24	0 0	7 5 } 6	25
Staph. 30,000	72	72	0 0	33 34 } 33½	48
Staph. 10,000	216	216	0 0	73 82 } 77	30
Staph. 3,000	720	720	0 0	120 120 } 120	17

Here the serum in the unlined segment of the tubes killed in the most favourable case, 24,000 staphylococci per c.cm.

Experiment. A. E. W.'s blood. (Same technique as in the above.) (Table XVIII.)

TABLE XVIII.

Dilution of staphylococcus culture implanted into the serum.	No. of microbes suspended in the serum in the		No. of colonies which developed in the serum in the		Percentage of survivors in unlined segment.
	Lined segment	Unlined segment	Lined segment	Unlined segment	
Staph. 160,000	6	6	0 0	0 3 } 1·5	—
Staph. 80,000	12	12	0 0	12 9 } 10·5	87
Staph. 40,000	24	24	0 0	19 19 } 19	80
Staph. 20,000	48	48	0 0	38 34 } 36	75
Staph. 10,000	96	96	0 0	50 67 } 58	60
Staph. 5,000	192	192	0 0	73 70 } 71½	37

Here the serum in the unlined segment of the tubes killed in the most favourable case, 4800 staphylococci per c.cm.

When we review these experiments we recognise that *the law*—for we may now call it so—*of zero, or all but zero, bactericidal response to minimal microbic implantations, and of progressively greater response to increasing microbic stimulation*, holds not only of implantations into blood, but also of those made into leucocytic suspensions. And we have further seen that precisely similar effects are obtained with sera pipetted off from respectively lightly and heavily implanted bloods, and also with sera imposed upon respectively lightly and heavily vaccinated leucocytes.

The problem as to whether the increasing killing of serophytic microbes witnessed in effectively vaccinated blood is attributable to increased phagocytic response, or to a development of bactericidal powers in the serum, would appear herein to find its answer.

We shall have to consider later whether the increased phagocytic response which is concurrently obtained does or does not in cases where the action of phagocytes is not mechanically barred, contribute its quota to the observed result.

We may now, taking our cue from the experiments set out in Tables XIII. and XVI., dispose of one further general point before entering deeper into the question of phagocytic response in vitro. On studying the protocols in question you will note two outstanding points of difference between these and those previously considered. It will be noted, first, that instead of the vaccine being directly incorporated into the blood it was here merely placed in abutment against the blood clots. And it will be noted further, that the smaller and larger doses of vaccine here brought into application do not here, as they do when incorporated into the blood, produce opposite effects in the form of positive and negative responses. Instead of that we have here with an extensive range of doses (in the one case with doses ranging from 1 in 2000 million to 1 in 25 million, and in the other case with doses ranging from 1 in 2400 million to 1 in 300 million of Tuberculin B.E.) with every dose a positive bactericidal response.

There is not in reality any matter for surprise in this. For consideration will show that when a vaccine is merely superposed upon a clot there will, in the initial stages of the experiment, come into operation upon the leucocytes only such fraction

of the total antigen as may diffuse into the clots. And in conformity with this there will, in the stage of the experiment we are considering, come into lethal operation upon the microbes disposed outside the clot, only the bactericidal substances elaborated in response to this first instalment of antigen.

A number of theoretically interesting points connected with this mode of bringing vaccines into application must be reserved for treatment in a separate paper, but it is of practical interest to reflect that the two contrasted methods of applying a vaccine which we have here been considering have their analogues, the one in intravenous administration and the other in subcutaneous application of vaccines. In the case of the first there is in respect to dosage very little margin of latitude. If we inject a little too much we produce an immediate negative phase. Contrariwise, where a vaccine is applied hypodermically the patient may, even in despite of the administration of an excessive dose, reap benefit from it. For the first instalment of antigen absorbed may achieve the therapeutic aim we have in view, and our aim once achieved any negative phase which may thereafter supervene would be quite innocuous.

INCREASED PHAGOCYTIC RESPONSE IN VITRO.

We may now pass to the consideration of the phagocytic response obtained in vitro.

Perhaps when all things are taken into consideration the most dramatic demonstrations of increased phagocytic response obtained in vitro by vaccines are those which are obtained by the ruse of employing in our phagocytic mixtures instead of unheated serum, heated serum—i.e., serum which is almost denuded of opsonin. It will suffice here to cite a single experiment.

Expt. 5.5.30. A. E. W.'s defibrinated blood.—The blood was centrifuged. The serum was then pipetted off and heated for 45° to 60° C. The corpuscles were washed several times in normal salt solutions. Two volumes of heated serum were then mixed with one volume of washed corpuscles and one volume of a six-fold diluted staphylococcus broth culture, and there was then added to the control phagocytic mixture one wash of physiological salt solution, and to the other mixtures in each case one wash of a dilution of Tuberculin B.E. These mixtures were then, after incubation for 20 minutes, centrifuged and recentrifuged for 45″ in each direction. Phagocytic films were then made from each sample of blood. (Table XIX.)

TABLE XIX.

A = Percentage of leucocytes which phagocytose.
B = Percentage of leucocytes containing an uncountable number of staph.

—	Phagocytic. Count.	Phagocytic. Index	A	B
Heated serum + corp's + staph./6 + 1 Wash of normal salt	2 / 3·3	2·6	1	42 / 57	5 / 5
Heated serum + corp's + staph./6 + 1 Wash (= 1/100th) of B.E. 256 million	6	2·3	58	16
" " " B.E. 128 million	2·6	1	10	8
" " " B.E. 64 million	7·7	3	67	21
" " " B.E. 32 million	10	3·9	66	19
" " " B.E. 16 million	7·1	2·8	60	21
" " " B.E. 8 million	6·1	2·3	49	21
" " " B.E. 4 million	12·0	4·6	88	48
" " " B.E. 2 million	5·6	2·2	56	18

In order to appraise at their proper value the figures set down in the first two columns of the above protocol account has to be taken of the fact that in counting the films any ingest of over 20 staphylococci was entered as an ingest of 20. If it had been possible to count the full number of microbes ingested (the percentage of leucocytes containing uncountable numbers is recorded in column 4 of the protocol) the phagocytic indices would have come out very much higher. The phagocytic counts with the optimum additions of vaccine would certainly have reached astonishing figures—let us say an average of 30 or 40 per cell, and the phagocytic indices would have reached 7·5 or 10.

An experiment like the foregoing furnishes conclusive evidence that leucocytes when treated with vaccines, respond, not only (as seen in previous experiments) by excreting bactericidal substances into the serum, but also by an increased phagocytosis. Similar, but owing to the larger phagocytic intake in the control, quantitatively less striking differences between the vaccinated bloods and the controls are obtained by adding appropriate quanta of vaccines to phagocytic mixtures containing, instead of heated, unheated serum. And analysis of these results by the chiastic method has shown that increased phagocytic response obtained is, in most cases, due to a combination of increased opsonic power developed in the serum and to increased phagocytic avidity in the leucocytes. Not infrequently, however, the opsonic power of the serum is increased, while the phagocytic avidity of the leucocytes is reduced; and again, sometimes the phagocytic avidity of the leucocytes is increased while the opsonic power of the serum remains the same or is reduced.

There is, however, in these respects, very little agreement between one experiment and another, and very little also between the figures which represent the phagocytic index of a blood and its component factors—i.e., the figures which represent (*a*) the opsonic index of the serum, and (*b*) the phagocytic avidity of the leucocytes. This is no doubt due to the fact that the washing, centrifuging, and standing in salt solution to which the leucocytes are exposed in chiastic and opsonic experiments all affect their intake, and it is probably also due to the serum of vaccinated bloods containing, in addition to opsonins, antigens which can evoke immunising response in the leucocytes used for testing. There is at this stage no need, I think, to labour the point that the leucocytes of a phagocytic mixture are responsive elements, and are not, in any sense, the analogues of chemical indicators.

IMPORTANCE OF THE FACTOR OF PHAGOCYTOSIS.

I now pass to consider certain general problems which require to be carefully pondered.

The first of these is the problem—already envisaged above—as to whether enhanced phagocytosis or the development of bactericidal power in the blood-fluids is the more important factor in the immunising response which eventuates in increased killing of serophytic microbes in the blood. In connexion with this arithmetical considerations make clear that inasmuch as the blood normally contains 7½ millions of leucocytes per c.cm. there would, if we implanted 100 microbes (and 100 microbes per c.cm. represents a formidable septicæmic infection) be an army of 75,000 leucocytes available for the phagocyting of each microbe.

The same sort of considerations apply to the opsonic capacity of the normal blood fluids. That opsonic capacity as measured (rightly or wrongly) by the ordinary phagocytic technique[14] easily permits of ingests of 10 to 20 microbes per leucocyte of normal phagocytic avidity—and to a total of 75 and 150 millions of microbes ingested per c.cm.

It will be obvious from these data that the normal blood already possesses a phagocytic capacity far in excess of all conceivable requirements. It follows that the explanation of inadequate phagocytosis of implanted or infecting microbes must be sought in the difficulty of leucocytic access to the implanted microbes. When we meditate upon these things and reflect that chemical access (that is access of dissolved bactericidal substances) to implanted microbes must, in the nature of things, be more easily realisable than leucocytic access, and consider further that such chemical access is, in the case of the circulating blood, secured, it comes home to us convincingly that the development of an even moderate amount of bactericidal power in the serum must count for more in the killing of serophytic microbes than any reinforcement of phagocytosis.

The further questions we have to consider are: (1) the question of immediate (I have before called it "*subitaneous*") immunising response; (2) the question of specific or non-specific immunity (we shall see that specific and non-specific are ambiguous terms); and lastly (3) the question of dosage.

THE IMMEDIATE RESPONSE.

One of the things I had to do in connexion with antityphoid inoculation was to refute with data obtained by measuring the bactericidal power of inoculated men before and after inoculation, the traditional belief that ten days must go over before the effect of a vaccination process becomes manifest. I showed there that the effect of inoculation upon the blood was already plainly manifest 24 hours after the administration of the vaccine. A further scaling down of the time deemed requisite for the manifestation of the effects of inoculation was achieved when it emerged from our measurements of the opsonic index that the effects of subcutaneous inoculation and after auto-inoculation were already well developed within an hour after the application of the ictus immunisatorius. And further research has shown that immunising response to vaccines is, in the case of intravenous inoculations, well developed within 10 minutes after the inoculation, and finally, both bactericidal and phagocytic experiments on the blood in vitro—which, of course, lend themselves better to accurate timing—have shown that there is instantaneous response to the introduction of vaccines into the blood. You will, when we come to consider the question of dosage, see that the time requisite for the development of maximum immunising response is not a simple function of the quantum of antigen incorporated, but is largely determined by the soluble or insoluble nature of the antigen and the lytic forces which the blood brings to bear upon it.

(*To be concluded.*)

[14] It will be shown elsewhere that quite different results are obtained when we employ (and the centrifugalisation method makes this possible) plasma instead of serum in our opsonic measurements.

SAVERNAKE HOSPITAL CONTRIBUTORY SCHEME.—Of this hospital's income of £10,471 last year, £4122 was raised by the contributory scheme—£1000 more than its total income ten years ago. The scheme has 4186 branch secretaries and collectors.

INJECTION TREATMENT OF VARICOSE VEINS AND ITS BEARING ON THE PROBLEMS OF THROMBOSIS.*

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THE injection treatment has within a short space of time so altered our previous ideas on the treatment of varicose veins that it may without exaggeration be described as revolutionary. There are fashions in medicine as in all things, but injection treatment has by now been widely tested, and the results have been found satisfactory by so many observers that its position in therapeutics may be regarded as established. The mode of action of the various solutions used therefore has an immediate practical interest. But there is an aspect other than the therapeutic, and that is: what effect, if any, has this new method of treatment had on our outlook on the problems of spontaneous thrombosis?

The subject may be conveniently considered under three headings: (*a*) The pathological changes resulting from injections and their explanation. (*b*) The relation between thrombosis produced by injections and spontaneous thrombosis. (*c*) The possible complications of injection treatment.

Pathological Changes after Injection.

In man the opportunity does not often occur of making a series of histological observations at regular intervals after injection, so that these changes are most conveniently studied in animals. The marginal ear-vein of the rabbit has been most often used for this purpose, since it is a comparatively large vein lending itself to continuous observation after the injection. But, while most of the recorded experiments deal with the changes at long intervals after the injections (Binet and Verne, Kern and Angle), it is the earlier changes that are important in determining the cause of the venous obliteration, and it is chiefly with these that this paper will deal.

In the first series of experiments, the marginal ear-veins of a number of animals were injected with 1 c.cm. of a 30 per cent. solution of sodium salicylate. The animals were killed at regular intervals and specimens thus obtained showing the microscopical appearances ¼ hour and ½ hour after injection, then at half-hourly intervals up to six hours, then at hourly intervals up to 12 hours, and finally at 24 hours. The immediate naked-eye effect of the injections was a general dilatation of the vessels of the ear, which as a result showed a diffuse pinkish blush. By 15 minutes as a rule the circulation in the injected vein had ceased, owing to intravascular coagulation. After some hours, and especially at 24 hours, the whole ear had become swollen and œdematous. Microscopically, the earliest change to be seen in the vein wall was a slight wrinkling and deposit of blood-pigments in the endothelial cells lining the vein (Fig. 1), while the vein valves also seemed liable to early damage (Fig. 2). But in some of these early specimens, in spite of the presence of intravascular clotting, a considerable amount of normal, apparently intact, endothelial lining could be seen (Fig. 1). Later, the endothelium tended to degenerate and disappear, the vein wall stained poorly, and occasionally became fragmented (Fig. 3), and by 24 hours the thin vein wall was almost completely destroyed. For the first few hours after

* Based on a Hunterian lecture delivered before the Royal College of Surgeons of England on Jan. 26th, 1931.

injection the tissues surrounding the veins showed no change, but later a progressively increasing infiltration with polymorphonuclear leucocytes could be seen (Fig. 4).

The histological changes following the intravenous injection of 30 per cent. sodium salicylate in the rabbit thus fall roughly into three stages: (1) intravascular coagulation; (2) destructive changes in the vein wall; (3) acute inflammatory changes in the surrounding tissues.

The significance of these histological changes will be discussed later, but it may be said that in these animal experiments intravascular clotting occurs when the vein wall is little altered, and before the histological signs of acute inflammation have developed.

In the next series of experiments, some of the other solutions commonly used in the treatment of varicose veins were tested in a similar manner to the salicylate, particularly sodium morrhuate, quinine and urethane, and glucose. Animals injected with 1 c.cm. of a 5 per cent. solution of sodium morrhuate showed changes in general similar to those following salicylate injection—i.e., a general dilatation of the vessels of the ear, the rapid formation of an intravenous clot, and subsequent œdema of the ear; and microscopically, degenerative changes in the vein wall (Fig. 5), and an acute inflammatory reaction in the surrounding tissues (Fig. 6). Five per cent. sodium morrhuate differed from the 30 per cent. salicylate in that it was not such a certain thrombotic agent. The solution of quinine and urethane used was one containing 13 per cent. of quinine and 6½ per cent. of urethane, the usual strength employed clinically. The difficulty in testing this solution was that in the rabbit the margin between a thrombotic dose and a lethal dose is small. But in the positive cases the changes produced in the ear were similar to those following injection of sodium salicylate and sodium morrhuate. The histological findings thus suggest that the general mechanism by which thrombosis is produced by these three solutions is similar.

The other solution tested was glucose. A 60 per cent. solution, the strength used clinically, had no effect when injected into the marginal ear-vein of rabbits. A solution was therefore made up twice this strength, the result being a thick syrupy fluid that only passed through a hypodermic needle with difficulty. Even with a solution of this strength thrombosis rarely resulted, though there was often a marked œdema of the ear. While conclusions derived from animal experiment do not necessarily apply to man, in the type of experiment here described glucose is certainly a much less efficient thrombosing agent than the other solutions.

MODE OF ACTION.

The next point for consideration is the means by which these solutions produce intravascular coagulation. The first thing to exclude experimentally was a purely traumatic effect from the introduction of the needle into the vein. This was done by injecting a series of control animals with dilute solutions of sodium salicylate and other substances under conditions similar to those of the main experiments, when it was found that any traumatic coagulum was strictly localised to the site of puncture. A simple traumatic effect having been excluded, there are four possible explanations of the thrombotic action of the solutions: (1) that they have a direct coagulating action on the blood; (2) that the coagulation results from the inflammatory reaction set up; (3) that it results from a physical action of the solutions on the vein wall; and (4) that it results from a chemical action on the vein wall.

(1) It was pointed out by Sicard, when he first began to use the method of intravenous injections for varicose veins, that the solutions he used had no direct coagulating action on the blood, and it is easy to carry out a simple series of experiments in a test-tube to confirm this.

Thus 30 per cent. sodium salicylate and freshly drawn rabbit's blood were mixed in a test-tube, and the rate of coagulation at room temperature compared with a similar mixture of normal saline and blood. With one part of sodium salicylate to one of blood, slow hæmolysis took place which was complete in about 12 minutes. When the concentration was reduced to one part sodium salicylate to two of blood, the mixture was still fluid at the end of 30 minutes, when a little hæmolysis was beginning to occur, though the control saline and blood mixture had completely clotted in 12 minutes.

The direct action of sodium salicylate is therefore that of an anticoagulant rather than a coagulant, and it is also a slow hæmolytic agent.

Similar experiments were performed with quinine and urethane and blood, again using saline as a control.

In order to dissolve the quinine and urethane, which tends to crystallise out at room temperature, it is necessary to warm it, so the saline was also warmed in the same water-bath. Heat accelerates the clotting process, and the control tube had firmly clotted in three minutes. Quinine and urethane and blood, on the other hand, mixed in equal parts, was still quite fluid and apparently unchanged at the end of half an hour, when the experiment was abandoned. A similar result was obtained with one part of quinine and urethane to two of blood.

Sodium morrhuate also has no direct coagulating action in vitro, but is a powerful hæmolytic agent, the addition of 1 c.cm. of a 5 per cent. solution to 1 c.cm. of blood resulting in almost immediate and complete hæmolysis. In all these solutions, therefore, a direct coagulating action on the blood can be excluded as the cause of the intravenous thrombosis.

(2) As for the second possible explanation, the clot has usually formed some time before the histological signs of acute inflammation appear; and, on the other hand, in some of the animals a well-marked inflammatory reaction was present without thrombosis. The actual inflammatory reaction can therefore be excluded as the cause of the thrombosis, though it probably plays an important part in securing the adhesion and rapid organisation of the clot.

(3) The theoretical objection to the third possibility—that the clotting depends on some physical phenomenon such as osmosis—is the fact that the solution is in gross contact with the vein wall for such a short time. But more positive evidence against osmosis is afforded by the fact that, in the experiments mentioned above, very strong solutions of glucose, which would have a high osmotic pressure, proved such unreliable thrombotic agents. Though osmosis might play a part under conditions of marked stasis, in the average case it is probably not the important factor.

(4) We are thus left with the explanation that the thrombosis is due to the chemical action of the injected fluids on the vein wall; a chemical process would more easily than a physical explain the damage to the vein wall resulting from the momentary contact of the solution. As a result of this damage, tissue juice is presumably liberated, which combines with the fibrinogen of the blood. While the general mode of action of the solutions is the same, it does not necessarily follow that the precise chemical changes are the same in all, but of this we have no knowledge.

FIGS. 1 2 3 4

FIG. 1.—High-power view of wall of ear-vein half an hour after the injection of 30 per cent. sodium salicylate, showing in places apparently intact endothelium. (× 235.)
FIG. 2.—Low-power view of same vein as in Fig 1, showing intravascular clot and remains of valve with fibrin network springing from it. The surrounding tissues are unchanged. (× 60.)
FIG. 3.—Low-power view of ear-vein nine hours after the intravenous injection of 30 per cent. sodium salicylate, showing destructive changes in the vein wall and polymorphonuclear leucocytosis in the surrounding tissues. (× 60.)
FIG. 4.—Ear-vein 24 hours after the intravenous injection of 30 per cent. sodium salicylate, showing almost complete destruction of vein wall and intense polymorphonuclear leucocytosis in the surrounding tissues. (× 60.)

Generally speaking, the sequence of events after the injection of varicose veins in man seems similar to that in animals. As a rule, no pain is felt at the time of the injection, though sodium salicylate sometimes provides an exception to this rule. The precise time of occurrence of thrombosis in man is difficult to determine. As judged by the history, it seems to be present in many cases within eight hours or so of the injection. In most cases, a varying amount of discomfort, due to inflammation in and around the vein wall, is complained of some hours after the injection, which is usually worse the next day. There has been no opportunity in this inquiry to make histological observations on the early changes in man, but Hanschell has described a case in which portions of the vein were excised and microscoped 15 minutes, 24 hours, and seven days after the injection. In 15 minutes there was no change in the wall of the vein or its lumen; at 24 hours the vein was filled with clot, there were destructive changes in the intima, and small round-celled infiltration in the tissues around the vein, while at seven days the clot was undergoing organisation. So that both clinically and pathologically the sequence of events after injections into varicose veins in man would appear to be generally similar to those already noted in the experimental injections.

There is, however, one important difference between the animal experiments and the thrombosis induced clinically in the treatment of varicose veins, and that is the relatively large doses required in the animal experiments. The doses that have had to be given to produce thrombosis, in spite of the fact that the rabbit's vein is so much smaller and thinner, are very similar to those employed clinically, and weaker solutions, such as 15 per cent. sodium salicylate, usually have no effect. The explanation of this difference probably lies in the rate of blood-flow. In

FIGS. 5 6 7 8

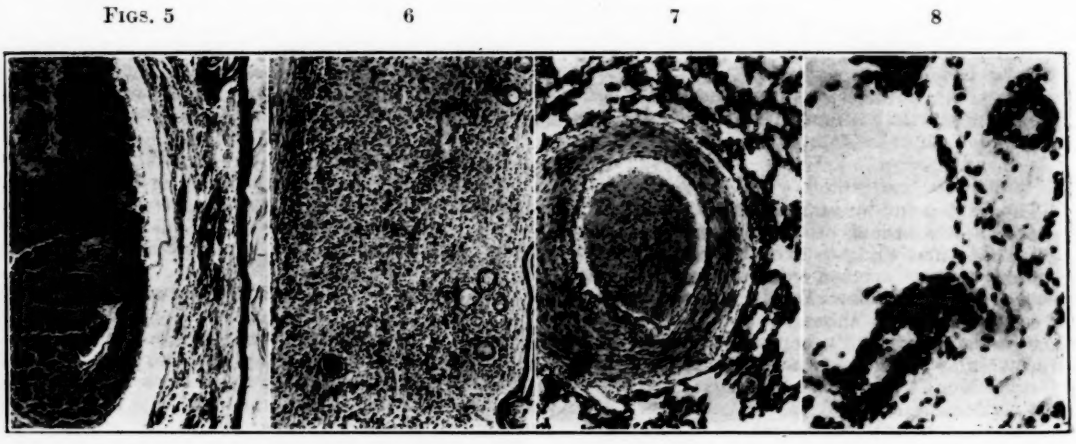

FIG. 5.—Ear-vein 48 hours after the intravenous injection of 5 per cent. sodium morrhuate, showing similar destructive and inflammatory changes. (× 50.)
FIG. 6.—To show the intense leucocytosis in the surrounding tissues 48 hours after the intravenous injection of 5 per cent. sodium morrhuate. (× 50.)
FIG. 7.—Lung artery of rabbit filled with hæmolytic debris and leucocytes after fatal dose of sodium morrhuate. (× 50.)
FIG. 8.—Lung capillaries choked with leucocytes after fatal dose of sodium oleate. (× 300.)

varicose veins we are dealing with a comparatively stagnant column of blood out of the main stream of venous return, whereas in the marginal ear-vein of the rabbit we are dealing with the main venous drainage of an organ with a free and active blood-supply. The practical significance of this difference is that it is probably this same factor—the rate of blood-flow—that in man protects the deep veins from thrombosis when varicose veins are injected, especially in the cases that are occasionally met of widespread superficial thrombosis following a single injection.

Relation between Thrombosis Produced by Injections and Spontaneous Thrombosis.

For comparison with the artificially produced thrombosis three typical and common forms of spontaneous thrombosis may be taken: (1) idiopathic thrombophlebitis arising in varicose and other superficial veins; (2) femoral thrombosis such as is met with after operation; and (3) massive pulmonary embolism.

Thrombophlebitis, spontaneously arising in varicose and other superficial veins, and chemically produced thrombosis are clinically indistinguishable. In both there is a hard tender lump with obvious inflammatory signs around, and in both the contained clot is a typical red thrombus. The presumption, therefore, is that their pathology is similar, and that the spontaneous thrombus too is due to some agent acting on the wall of the vein. In some cases this agent may be something obvious, such as a septic process; in others it may be something obscure.

The thrombosis associated with massive pulmonary embolism, on the other hand, presents many differences. Local changes in and around the vein are so little marked that in a large number of cases the source of the embolus cannot be found even at post-mortem, while the structure of such a thrombus shows a typical architectural arrangement of platelet, leucocyte, and red clot.

A localised femoral thrombosis presents features intermediate between idiopathic thrombophlebitis and pulmonary embolism. Signs of inflammation in and around the vein wall are present, as in the former, but the clot has the same naked-eye and microscopical characteristics as the pulmonary embolus clot.

There are thus three gradations: a spontaneous thrombophlebitis that appears identical pathologically with the chemically produced thrombus, localised femoral thrombosis representing an intermediate stage, and, finally, the thrombosis associated with pulmonary embolism. The difficult thing to determine is whether these three gradations represent different pathological processes, or similar pathological processes of different degrees.

The causes of thrombosis are usually classified under three headings: (1) changes in the vessel wall; (2) changes in the blood flow; and (3) changes in the blood itself. Various changes in the blood have been described after operations and other conditions predisposing to thrombosis, such as changes in the coagulation time (Allen), the sedimentation time (Heusser), the leucocyte count (Dawson), and more recently the platelet count (Dawbarn, Earlam, and Evans). But no conclusive experimental proof has yet been brought forward that these changes are directly related to thrombosis. On the other hand, by a combination of the first two factors—stasis and an alteration of the vessel wall—thrombosis can be induced with ease, both clinically in the treatment of varicose veins and experimentally. The injection treatment of varicose veins thus introduces no new principle, but its pathological importance is that it concentrates attention anew on these two factors—stasis and changes in the vessel wall—to the relative overshadowing of changes in the blood.

FIGS. 9 10 11

FIG. 9.—Lining of human varicose vein that failed to respond to injections, showing cellular fibrous tissue on fibrosed muscle. (× 35.)

FIG. 10.—Muscle of rabbit 24 hours after injection of sodium morrhuate, showing, from left to right, necrotic muscle remnants, dense aggregations of polymorphonuclear leucocytes, and normal muscle bundles separated by œdema and leucocytes. (× 50.)

FIG. 11.—Muscle of rabbit 21 days after injection of 30 per cent. sodium salicylate, showing dense cellular fibrous tissue intersecting muscle. (× 50.)

The Possible Complications of Injection Treatment.

These may be conveniently considered under the following headings: (1) Pulmonary embolism. (2) General symptoms. (3) Failure of a vein to respond to injections. (4) Injection ulcers.

(1) *Pulmonary embolism.*—The theoretical danger of pulmonary embolism was the first and most obvious objection to the injection treatment of varicose veins. Time and experience have proved that it is an excessively rare complication of injection treatment, and the reasons for this are probably twofold. In the first place, varicose veins are a very rare source of emboli at any time. Thus, out of 24 consecutive cases in the post-mortem room of the Middlesex Hospital of pulmonary embolism in which the source of the embolus could be traced, in none was it a varicose vein; and other similar figures could be given. In other words, the stagnant condition in varicose veins that favours thrombosis renders embolism unlikely. The second reason can be found in the histology of injected veins. The thrombus itself after injections is an ordinary red thrombus similar

to other rapidly formed thrombi, but in and around the vein wall there is an inflammatory reaction that probably favours the early adhesion and organisation of the contained thrombus.

(2) *General symptoms.*—Patients after injections for varicose veins are not as a rule upset, and are able to continue their normal occupations; only rarely are the general symptoms severe. In man, therefore, the margin between a therapeutic and a toxic dose is a wide one. It was thought, nevertheless, that a study of the toxic effects of these solutions in animals would be of some interest in indicating the type of reaction that might follow excessive doses in man.

It has been seen that rabbits tolerated comparatively large doses of a strong solution of sodium salicylate. This is in accordance with clinical experience, which is that sodium salicylate is the solution that can be used in the highest concentration and dosage. In some of the animals, however, that received 2 c.cm. of a 30 per cent. solution intravenously, a bright red condition of the whole of both lungs was found, which was seen microscopically to be due to diffuse hæmorrhage and œdema of the lungs, presumably the result of damage to the endothelium of the lung capillaries.

It has been noted already that in vitro sodium morrhuate is a powerful hæmolytic agent, and when it is injected in large doses intravenously in animals a similar hæmolysis may take place in the circulation. This may be shown by the passage of hæmolysed blood in the urine, but more frequently sudden death results, owing to the blockage of the lung arterioles and capillaries with hæmolytic debris and leucocytes. Fig. 7 shows a lung artery from such a case. A similar blockage of the lung capillaries with hæmolytic debris and leucocytes is produced by other unsaturated fatty acids besides sodium morrhuate. The most striking appearances were seen with sodium oleate, which is not used in the treatment of varicose veins but was tested on account of its chemical and physical relationship to sodium morrhuate. Fig. 8 is a microphotograph of the lungs of a rabbit that died after the intravenous injection of 1 c.cm. of a 5 per cent. sodium oleate, showing the lung capillaries choked with leucocytes and debris. The leucocytes are much more marked than in the case of sodium morrhuate, and this may be due to the more marked irritant action of sodium oleate on the endothelium of the lung capillaries, whereby the leucocytes adhere more readily.

Quinine and urethane was the most toxic of the three solutions, 1 c.cm. as a rule killing a 2 kilo rabbit in a few seconds. Microscopically, no definite change can be detected in the lungs, and presumably the action is directly on the heart or central nervous system. These findings can be correlated with the fact that clinically, according to some authors, quinine solutions are the most likely to be associated with idiosyncrasy—i.e., an excessive general reaction from an ordinary therapeutic dose.

It should be emphasised that these toxic effects in animals are obtained with doses that, taking into account the weights of the animals as compared to man, are many times in excess of the ordinary clinical therapeutic dose.

(3) *Failure to respond.*—Fig. 9 is a microphotograph of the varicose vein of a patient who had had injections at weekly intervals for several months without success, so that eventually it was excised. Microscopical examination showed a thickened vein, the inner coat of which was composed of a thick mass of young cellular fibrous tissue, which presumably indicates an inflammatory reaction from the injections. There is clinical evidence to suggest that if for any reason the first few injections fail to act, a condition of the vein refractory to thrombosis is produced, and it may be that some such anatomical alteration of the vein-lining as is shown by this case may be the cause.

(4) *Injection ulcers.*—This is usually an indication that the solution has been injected into or has leaked into the tissues around the vein. Occasionally, however, it occurs when the solution has been properly injected into the vein, from sloughing of the whole vein wall with the surrounding skin. These ulcers are painful and chronic, and often constitute a much greater nuisance to the patient than the original varicose veins. No solution is exempt from liability.

In animals, the effect of interstitial injections depends on the site injected. Thus, a few minims of any of the solutions injected into the tense tissues of the rabbit's ear causes inflammation with ulceration and often sloughing of the whole thickness of the ear. On the other hand, the injection of 1 or 2 c.cm. under the loose skin of the thigh sometimes causes a similar inflammatory reaction with ulceration, and sometimes has no gross effect. The ulceration does not depend on the solution used, since it occurred after the injection of each kind.

After intramuscular injections also, the effect of all three solutions—sodium salicylate, sodium morrhuate, and quinine and urethane—is essentially the same. Sometimes there was merely an inflammatory œdema that gradually subsided, but more often there was an early stage of necrosis and acute inflammation and a late stage of fibrosis. Fig. 10 illustrates the appearances in the early stages after injection. In the centre is necrosed muscle surrounded by a dense mass of acute inflammatory cells, while further out the muscle bundles are being separated by œdema and loosely arranged inflammatory cells. In the late stage of fibrosis (Fig. 11) there was marked fibroblastic proliferation in which the cells of the muscle sheaths appeared to be participating. It may be presumed that injection ulcers of man show similar changes.

In conclusion, injection treatment of varicose veins has proved a valuable therapeutic measure, but the object of this paper is to show that the subject is worthy of study not only from this aspect but also as a large-scale experiment in the production of thrombosis and aseptic inflammation.

Summary.

(1) The injection of some of the solutions commonly used in the treatment of varicose veins into the marginal ear-vein of rabbits is followed by the early formation of an intravenous clot, destructive changes in the vein wall, and an acute inflammatory reaction in the surrounding tissues. The general mode of action of the different solutions is similar. The intravenous clot is formed when the vein wall is little altered and before inflammatory changes have occurred and is probably due to liberation of tissue juice from the chemical action of the solutions on the vein wall.

(2) After the injection of massive doses of these solutions intravenously in animals, death results in various ways, depending on the particular solution. Interstitial injection produces necrosis and an acute inflammatory reaction, often associated with ulceration, and later a dense fibrosis. In this respect the action of all the commonly used solutions is similar.

(3) The sequence of events after the injection of varicose veins in man seems generally comparable with the experimental findings. In addition, all gradations may be met with between thrombosis, indistinguishable clinically and pathologically from

chemical thrombosis, and a condition like pulmonary embolism with apparently quite different features.

I have pleasure in acknowledging my indebtedness to Prof. J. McIntosh for granting me facilities for carrying out these investigations, and for his kind interest.

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A CASE OF ACUTE LYMPHATIC LEUKÆMIA.

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A MAN, aged 44, was admitted to the Mater Misericordiæ Hospital on Nov. 19th, 1930. There was a purpuric rash on the front of the chest, on both forearms and on the right shin; on the dorsum of the right foot there was a subcutaneous ecchymosis which was evidently, from the colour changes, some days old. The patient did not feel or look very ill, appeared only slightly anæmic and came simply because of the purpura, which had first appeared five days before admission. His previous history was unimportant except for typhoid fever in 1911. General physical examination revealed nothing abnormal except one abscess shown by X rays at the root of the upper left second molar tooth. The heart, lungs, abdomen, and urine were normal, the blood pressure 150/80, the pulse-rate 72, the pulse regular, and the spleen and liver were apparently not enlarged. The erythrocyte count was 3,940,000 and the leucocyte count 8600 per c.mm.; the hæmoglobin was 90 per cent. (Sahli), the colour-index 1·15, and the platelet count 100,000 per c.mm. The differential leucocyte count showed (per cent.) 43 small lymphocytes, 26 lymphoblast-like cells, 16 large lymphocytes, 12 polymorphonuclear neutrophile leucocytes, and 3 large mononuclear cells (see Table). Reticulocytes were 0·8 per cent. and there was less than 0·1 mg. of bilirubin per 100 c.cm. of blood. The blood calcium was 9·4 mg. per cent., the clotting time four minutes, the bleeding time from a prick two and a half minutes, and the clot retraction poor. The Wassermann reaction was negative. A fractional test-meal analysis, done because of flatulence and slight glossitis, after the patient had been about three weeks in hospital, showed achlorhydria.

For the first two weeks of observation, purpura was a prominent feature, crops of purpuric spots appearing in some areas of skin while they were fading in others, and there were occasional subcutaneous extravasations of blood of moderate size; later the purpura became less prominent, and in the last two weeks it showed itself only as odd spots. A few days after admission oozing of blood from the gums became troublesome and remained so throughout, except when it disappeared for four or five days after transfusion of blood. There were occasional hæmorrhages from the gastro-intestinal tract (melæna), occasional attacks of hæmaturia and epistaxis, and submucous hæmorrhagic spots frequently appeared on the buccal mucous membrane and soft palate. Blood culture was negative and at no time was there pharyngitis or stomatitis. On Dec. 14th the patient complained of dimness of vision, and ophthalmoscopic examination showed rather extensive retinal hæmorrhages which were pronounced subhyaloid by Dr. D. O'Donoghue; later, retinal, vitreous, and subconjunctival hæmorrhages occurred.

The abscessed tooth was removed by Dr. Ryan a few days after admission and the resulting steady oozing of blood from the alveolus gave some trouble before it was controlled. In the latter half of the illness the temperature sometimes rose to about 100° or 101° F., for a few consecutive days; as time went on the respiratory rate gradually rose to 38 and the heart-rate to 140, and as the anæmia progressed "hæmic" murmurs became audible over the præcordium. The progress was downward, the patient becoming gradually weaker and more anæmic, with temporary partial improvement for some days after transfusion of blood. The spleen was never palpable and the liver edge was for the first time just felt below the costal margin two days before death.

The patient died 67 days after admission and a partial autopsy was permitted. The results of the chief laboratory examinations are recorded in the Table, and the post-mortem findings are discussed below.

The main treatment consisted of transfusion of whole (uncitrated) blood; five such transfusions were given of 320 to 1000 c.cm. each on Nov. 16th, 23rd, and 24th, and Dec. 6th and 18th. Adrephine and adrenalin were used for local treatment of the gums, and hæmoplatic serum for local treatment and by injection; adrenalin was also administered subcutaneously, by mouth and per rectum, and attention was directed to mouth hygiene. Whipple's new liver extract with iron for secondary anæmia, liver extract for pernicious anæmia and whole liver were, in turn, given by mouth, with no beneficial result. Radiostoleum was given by mouth, calcium was given intravenously and by mouth, and iron and hydrochloric acid were given by mouth. These and other drugs were often ordered in desperation and not necessarily because of any scientific basis for their use. The diagnosis of acute ("aleukæmic") lymphatic leukæmia was made after the first blood count, and, we believe, was verified by the subsequent events. Leucopenia appeared after some weeks and was replaced towards the end by lymphocytosis of considerable degree with almost complete agranulocytosis.

The first total leucocyte count immediately impressed the observer by the size of the white blood corpuscles. On examination of the stained films this feature was again prominent, as was also the immature type of many of the white cells. The cells which at once focused attention in the stained smear were of the large lymphocyte type, but these cells bore characteristics which placed them in a category of priority in hæmatopoietic origin to the mature large lymphocyte of the peripheral blood. Apart from the relatively large size of the cells in question—about 18 microns in diameter—even more striking and undoubtedly more cytologically important was their nuclear structure. The nuclei of these cells showed a coarse basi-chromatin stippling, which at the nuclear edge was collected into a fairly dense nuclear membrane. A varying number of nucleoli were present—2 to 3 per cell. The nuclei measured about 16 microns in diameter and showed a graceful, sinuous but comparatively rounded outline. The cytoplasm showed a clear non-granular rim of varying depth, at the widest about 2 microns in diameter. These characteristics enabled the cells to be classified as lymphoblasts. In contradistinction, the nucleus of the myeloblast presents a fine stippled structure and no nuclear membrane, while the nucleus of the pro-monocyte has a fine thread-like basi-chromatin arrangement; no such cells were seen in this patient's blood.

The oxidase reaction has fallen somewhat into disrepute of recent years, owing to its inability to distinguish between the early myeloblast and the early lymphoblast; however, its application failed to demonstrate any granules in the cells under examination. We are inclined, for various reasons, to lay special stress on the morphological characters of the lymphoblasts; they appeared in the blood at an early stage of the disease, they indicated a grave hæmatopoietic lesion, and they increased in numbers through the illness.

The number of lymphoblasts in the blood was considerable on the first examination, comprising 26 per cent. of the differential leucocyte count. The remainder of the differential count showed 43 per cent. of small lymphocytes, 16 per cent. of large lymphocytes, 3 per cent. of large mononuclears, and 12 per cent. of polymorphonuclear neutrophiles. The total leucocyte count only numbered 8600 per c.mm. In order to avoid a tedious repetition of figures the Table has been constructed to show the various important laboratory findings during life.

Through the whole series of observations there was a rapidly progressive anæmia which very soon assumed a "pernicious" type. There was no leucocytosis until near the end; indeed, although there was soon a leucopenia, it must be noted that the fall in leucocytic numbers ran almost parallel on its own level with the decreasing numbers of red blood corpuscles, until in the later examinations a leucocytosis became manifest. The relative lymphocytosis might, at first sight, be taken to be the result of a compensatory over-activity of a normal lymphocytic system. The lymphocytic system showed, however, grave departure from the normal, as evidenced by the occurrence, persistence, and increase of immature elements—namely, the lymphoblastic cells. It would seem as if the disease of the lymphocytic system was the basic lesion and that the myeloid disturbance, as evidenced by the decrease of granulocytes and blood platelets, and the megaloblastic anæmia, were secondary. The disease was, therefore, considered to be a leucosis of the acute lymphatic type, but exhibiting unusual characters. It was now considered necessary to correlate our findings with the known atypical leukæmias. To quote from Piney [1]:

"It has long been recognised (Cohnheim) that all the anatomical changes characteristic of 'leukæmia' might occur without any increase in the number of circulating leucocytes, although there were grave alterations in the qualitative composition, as evidenced by the presence of immature cells of a character not found in the normal circulation; this is the 'pseudo-leukæmia' of Cohnheim and the 'aleukæmic leukæmia' of many authors. The essential changes in the hæmatopoietic tissue in these diseases are great cellular overgrowths together with alteration in the structure of the newly formed cells."

Reed,[2] in 1902, described a case of acute lymphatic leukæmia without enlargement of lymphatic glands.

In our case, in the early stages, the colour-index of 1·15 may, we think, fairly be taken as at an extreme maximal normal point. On one occasion (Dec. 9th) it rose to 1·36, but in two days' time it returned to 0·92; on Dec. 15th it rose to 1·25, but in three days' time it fell to 1·15, to reach unity four days later.

Date.	Erythrocytes per c.mm.	Hæmoglobin per cent.	Colour-index.	Leucocytes per c.mm.	Platelets per c.mm.	Anisocytosis.	Poikilocytosis.	Polychromatophilia.	Punctate basophilia.	Normoblasts.	Megaloblasts.	Small lymphocytes.	Large lymphocytes.	Large mononuclears.	Polymorphonuclear neutrophiles.	Eosinophiles.	Basophiles.	Lymphoblasts.	Other findings.
Nov. 20	Mill. 3,940	90	1·15	8,600	100,000	—	—	sl.	—	—	—	43	16	3	12	—	—	26	Clotting time 4 min.; bleeding time 2½ min.; clot retraction not good. Calcium, 9·37 mg. per 100 c.cm. serum. Urine: no album'n.
,, 24	—	—	—	—	165,000	+	—	—	—	—	—	—	—	—	—	—	—	—	Stools: occult blood strong positive.
Dec. 1	3,280	70	1·07	8,400	145,000	+	—	rare.	—	—	—	27	6	2	13	—	—	52	Tendency of white blood corpuscles to break down and form shadow cells. Rieder cells present.
,, 4	2,620	60	1·15	8,200	145,000	+	sl.	—	—	—	—	23	11	—	10	1	—	55	Reider cells present.
,, 9	1,680	45	1·36	6,600	125,000	+	sl.	rare.	—	—	1 in 1 film	17	9	—	4	—	—	70	Urine: heavy cloud of albumin; blood.
,, 11	1,900	35	0·92	5,100	150,000	+	sl.	sl.	—	—	1 in 1 film	16	9	—	5	—	—	70	Megalocytic tendency.
,, 15	1,440	35	1·25	5,000	75,000	+	sl.	sl.	—	—	—	28	12	1	12	1	—	46	Urine: trace of albumin. Stools: occult blood strong positive.
,, 18	1,340	30	1·15	3,700	90,000	+	sl.	sl.	sl.	—	1 in 1 film	36	14	2	10	—	—	38	Reticulocytes: 0·8 per cent. Test meal: achlorhydria.
,, 22	1,010	20	1·00	2,700	80,000	+	sl.	—	sl.	5 in 2 films	1 in 2 films	45	3	1	9	—	—	42	Distinct megalocytic tendency. Reticulocytes: 1·2 per cent. van den Bergh: less than 0·1 mg. of bilirubin per 100 c.cm. of plasma. Urine: trace of album'n; a few red blood corpuscles.
,, 23	—	—	—	—	—	+	—	—	—	—	—	—	—	—	—	—	—	—	Blood culture: negative.
,, 29	1,450	34	1·1	2,800	—	+	sl.	sl.	—	—	—	27	5	—	7	1	—	60	Numerous free particles of cell cytoplasm.
,, 2	1,520	30	1·0	3,000	150,000	+	—	sl.	sl.	—	1 in 1 film	38	5	—	18	—	—	39	—
,, 9	—	—	—	2,000	—	+	sl.	sl.	sl.	—	—	31	6	—	15	1	—	47	Megalocytic tendency.
,, 17	1,125	20	0·9	11,350	29,000	+	sl.	sl.	—	—	—	23	11	2	13	1	—	50	,, ,,
,, 20	—	—	—	23,000	—	sl.	sl.	sl.	sl.	1 in 1 film	1 in 1 film	8	3	—	3	—	—	86	—
,, 24	—	—	—	31,000	—	sl.	sl.	sl.	—	—	—	8	4	—	1	—	—	87	A few Rieder cells; numerous free particles of cell cytoplasm.

Mill. = millions. sl. = slight or few. + = marked.

[1] Piney, A.: Recent Advances in Hæmatology, London, 1931.
[2] Reed, D. M.: Amer. Jour. Med. Sci., 1902, cxxiv., 653.

It is here interesting to cite a case of "aleukæmic" leukæmia reported by Brodribb and Lazarus-Barlow [3] with an erythrocyte count of 2,200,000 per c.cm., a total leucocyte count of 6600 per c.mm., and a colour-index of 1·4.

Divergent views exist as to the significance of megaloblasts in the peripheral blood. Naegeli and his followers contend that their presence is pathognomonic of pernicious anæmia. Their occurrence in other conditions has, however, been noted by various authorities. Piney [1] states that Ullman and Weiss recorded a case which in its early stages had all the characters of pernicious anæmia, but later became converted into an equally typical case of acute leukæmic lymphadenosis.

Achlorhydria does not appear to have been recorded in the study of previous published cases of acute lymphatic leukæmia.

The blood films showed an abnormal frangibility of the lymphoblastic cells, characterised by the presence of numerous so-called basket, shadow, or smudged cells; there were also present numerous Rieder cells or binucleate lymphoblasts.

POST-MORTEM EXAMINATION.

Only a partial examination was permitted, and this was performed on Jan. 25th, about three hours after death. Attention was directed to what were considered the most important organs. The abdomen was opened, and it was noted that the liver was slightly enlarged, pale in colour, firm in consistency, with sharp edges, and that it bled freely on incision; the whole liver was not removed but a small slice was taken for examination. No enlarged lymphatic glands were felt on palpation in the abdominal cavity. The spleen was removed entire and was slightly enlarged, weighing 276 g. The substance of the spleen was moderately soft, showing bright red points on a pinkish background. The left kidney was removed, was of about normal size and was embedded in a large quantity of perirenal fat of a dead white colour. It was smooth, showed slight persistence of fœtal lobulations and was of a uniformly pale colour.

The thoracic cavity was not opened. The only palpable superficial gland, a small oval one about the size of a haricot bean, was removed from the left inguinal region. The head of the tibia was trephined and an attempt was made to obtain a sample of the bone-marrow; this marrow was completely fluid, of a pale colour, showing a few red streaks, and was of about the consistency of cream. Even scraping with a Volkmann's spoon produced only a greasy fluid which immediately spread out, forming a scum, on the surface of the fixing fluid. A portion of a rib was excised; its marrow appeared normal to the naked eye. Smears were made from the splenic pulp and from the tibial and rib marrow.

EXAMINATION OF FILM PREPARATIONS OF ORGANS.

Bone-marrow of tibia: Films stained with the greatest difficulty owing to their greasy nature. After treatment with ether and alcohol, only a few scattered patches with cellular content could be made out. These areas consisted partly of normal and megalocytic red blood corpuscles (one megaloblast was seen), and partly of cells closely resembling the lymphoblastic cells found in the peripheral blood; only one myelocyte was noted and no polymorphonuclear cells.

Bone-marrow of rib: The cells closely resembled lymphoblasts. No polymorphonuclear cells were seen.

Spleen smears: Besides showing a number of red blood corpuscles and a few large pigment-containing cells, the bulk of the cells seen were of lymphoblastic type.

In all the film preparations, other than those of the blood, the cells were almost devoid of cytoplasm, were distorted, stained indifferently, and were unsuitable for careful cytological study.

EXAMINATION OF SECTIONS.

Lymphatic gland: The architecture of the gland was moderately well preserved. The lymph follicles were intact, and, regarded as a whole, there was no germinal-centre proliferation. The sinuses and the pulp of the gland contained a greater number than normal of large cells of lymphocyte type. The impression conveyed was that the gland, acting, as it were, as a net, had caught up in its meshes numerous lymphoblastic cells.

Spleen: The malphigian corpuscles were in evidence but were not unduly prominent, nor were they increased in size. Their small cells stood out rather clearly in contrast to the larger cells packing the splenic pulp. Careful examination of the cells contained in the trabecular vessels and of those in the pulp showed them to be identical in appearance and of lymphoblastic type.

Kidney: No collections of lymphoblasts were seen in the kidney. A few were, however, present in the renal capillaries.

Bone-marrow of rib: The cells contained in the marrow spaces were almost entirely of the large lymphocyte type.

Liver: The liver cells in general showed a slight fatty infiltration and a considerable deposit of pigment. The most striking features were collections around the portal areas of lymphoblastic cells, and a subcapsular zone of considerable depth containing many of the same cells. These cells in the portal areas and subcapsular zone were identical with the cells contained in the portal vessels, and were morphologically lymphoblasts. Numbers of these lymphoblasts in the portal areas showed mitotic figures. This particular distribution of lymphocytic cells is very characteristic of lymphatic leukæmia (lymphadenosis).

As only a partial post-mortem examination was possible in this case it is useless to speculate as to the site of origin of the over-production of the lymphoblasts, but in this connexion it is interesting to note the mitoses in the periportal cellular collections.

Leishman's and Giemsa's stains were used for the study of the blood films, and hæmatoxylin and eosin for the paraffin sections. The oxydase reaction was done with hydrogen peroxide and benzidine. We are, of course, aware that it is by many observers considered impossible to distinguish between the lymphoblast and the early myeloblast, but we believe that we were dealing with a case of lymphatic leukæmia for the reasons already stated.

[3] Brodribb, A. W., and Lazarus-Barlow, P.: THE LANCET, 1931, i., 347.

CALCIUM THERAPY AND THE TOXÆMIAS OF PREGNANCY.

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Any means at our disposal to reduce maternal mortality must be exploited; and next to septicæmia, eclampsia is the most potent factor in the production of this mortality. A plethora of investigations have been undertaken, particularly on the biochemical aspect of this disease. This has emphasised the importance of calcium.

Calcium, we know, has an intimate relation to nervous sensitivity; this is shown by the increased excitability of nervous tissue on diminishing the calcium content of the solution which permeates it. Since tetany and uræmic twitchings are associated with a hypocalcæmia,[1] the convulsions of eclampsia might be attributed to a similar disturbance of the calcium content of the serum. A number of authorities have found a progressive lowering of the serum calcium in the latter months of pregnancy. Although there are only about 0·5 g. of calcium in the whole maternal blood stream, we know that the fœtus drains off as much as 8 g. for its own uses.[2] However, there is great difficulty in perfecting a

correct technique of calcium estimation. One is, therefore, inclined to suggest that some of the results of the above workers are due to errors of technique. Actually, I always estimated the calcium of a normal blood with every batch of abnormal specimens. This showed the necessity of vigorous centrifugalisation and absolute freedom from hæmolysis. The results obtained are otherwise ridiculously low.

Nevertheless, it is tempting to correlate, if possible, these three groups of phenomena—the convulsions of hypocalcæmia, the fœtal drain of calcium from the mother, and the convulsions of eclampsia.

Minot has produced in dogs a condition very similar to eclampsia.[3] By giving carbon tetrachloride to animals fed on lean meat he has induced convulsions. With the intravenous administration of calcium chloride, the dogs have recovered 30 minutes after the injection.

TRIAL OF CALCIUM.

During the months January to March of this year there were admitted to Queen Charlotte's Hospital two cases of eclampsia, eight of pre-eclampsia, and one of hyperemesis gravidarum. The serum calcium was estimated in all these cases by means of the Kramer and Tisdall method. Estimations were made in duplicate, and the normal value of serum calcium was taken as 9 to 11 mg. per 100 c.cm. of serum. In only one case—an eclampsia—was the serum calcium below 9 mg. The readings were as follows :—

	Per 100 c.cm. serum.		Per 100 c.cm. serum.
Eclampsia	8·5 mg.	Pre-eclamptic toxæmia ..	9·1 mg.
,, ...	11·3 ,,	,, ..	10·1 ,,
Pre-eclamptic toxæmia ..	11·69 ,,	,, ..	9·8 ,,
,, ..	9·3 ,,	,, ..	9·8 ,,
,, ..	9·09 ,,	Hyperemesis gravidarum ..	9·3 ,,
,, ..	9·5 ,,		

In the hope of ameliorating the fits in eclampsia, calcium, in the form of calcium gluconate (10 c.cm. of 10 per cent. solution), was administered intravenously in the above two cases. These will be considered in detail.

CASE 1.—Primigravida, aged 27. Systolic blood pressure, 170. Patient drowsy, slight œdema of legs. Urine solid, with albumin. Three fits before admission. Serum calcium, 8·5 mg. One fit two hours after calcium injection. Serum calcium ten hours later, 10·5 mg. Delivery took place 33 hours after admission. The patient was discharged three weeks later. Serum calcium, 9·6 mg.

CASE 2.—Primigravida, aged 25. Slight œdema of legs. Blood pressure, 180. Urine solid, with albumin. Mentally dull. The first fit occurred during the withdrawal of blood for serum calcium estimation, which reading was 11·3 mg. Following the intravenous injection of calcium four fits occurred during the space of 15 hours, within which time the patient had been delivered. The serum calcium at the end of this period was 13·9 mg. There were three more fits, making a total of eight. Twenty-six days after delivery the serum calcium was 10·8 mg. Renal efficiency tests pointed to impaired function of the kidney (blood-urea—53 mg. per 100 c.cm. ; urea concentration, first hour, 0·8 per cent. ; second hour, 0·8 per cent. ; third hour, 0·8 per cent.).

It will be seen that in the first case there was a definite hypocalcæmia, and, notwithstanding the administration of calcium, one fit occurred. In the second case there was a marked hypercalcæmia, and still the fits persisted. The criticism might be made that the convulsions were maintained by the excessive calcium content of the serum. However, it has been shown experimentally in dogs that there are no ill-effects until the serum calcium reaches 14 to 15 mg., when the predominating features are dullness, loss of appetite, atonia, and dehydration.

CONCLUSIONS.

(1) In pregnancy toxæmia there is little deviation from the normal value of serum calcium. (2) In eclampsia there may be fairly wide variations ; in the one case there was a slight hypocalcæmia, in the other a definite hypercalcæmia (artificially produced). (3) Calcium therapy in eclampsia is disappointing, and it would appear that the fits are not influenced by the calcium content of the serum.

I am indebted to the staff of Queen Charlotte's Hospital for allowing me to utilise their cases.

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CLINICAL AND LABORATORY NOTES

A CASE OF CANCER OF THE BREAST

TREATED WITH RADIUM AND X RAYS.

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THE following case possesses several features of technical interest.

A woman, aged 40, experienced pain in the right breast. A growth, evidently carcinomatous, about the size of a tangerine orange, was found under the nipple, which was retracted but otherwise normal. There was no discharge, nor was the skin involved. One enlarged gland could be felt in the supraclavicular fossa. A complete radiological examination demonstrated small metastases in the thorax. Further investigation disclosed a large tumour occupying the pelvis ; this proved to be a fibroid about the size of a six-months' pregnant uterus. The surgical removal of the breast—a complete Halsted operation—together with a dissection of the glands in the supraclavicular fossa and removal of the fibroid was considered. It was clear, however, that removal of the breast would have no influence on the thoracic metastases. Consequently, removal of the fibroid would benefit the patient but little, and finally there was the doubt as to whether the patient would stand the strain of the double major operation.

The final decision was to implant radium needles under the growth in the breast and glands in the supraclavicular fossa ; to follow this up, as soon as possible, by X radiation—using the "saturation" technique for the destruction of the metastases. The large radiation field used in this method would at the same time include the uterine fibroid. Radium needles were inserted under the growth and glands by the surgeon, and the first saturation dose was administered on the tenth day after the insertion of the needles. At this period considerable local reaction was present, the breast being erythematous and painful, and there was slight sloughing of the skin towards the axilla.

Some workers state that radium and X rays should not be mixed ; in other words, X rays should not be used while radium reaction is still apparent. In this case, however, I decided otherwise, so included the breast in the radiation field, which covered the whole thorax. The immediate effect was a rapid clearing up of the sloughing, while certainly no ill-effects were noticeable.

The trunk was divided into two radiation fields, thoracic and abdominal, and the dose brought up to the point inducing slight nausea. The fibroid, of course, was included in the abdominal field. Without any undue disturbance the breast returned to its normal consistence, although the nipple is still slightly contracted. The glands in the supraclavicular fossa are not palpable, and the opacities previously seen in the thorax are no longer apparent, while the fibroid has shrunk to the size of a cricket-ball.

The saturation method is the utilisation of X rays of the medium wave length with light filtration, and has for its object the absorption of a large number of heterogeneous rays. By this method the dose can be administered over a large area without danger or severe constitutional disturbance of the patient—an important point in patients with malignant disease. It is only in this way that we can expect to influence, by direct and indirect means, these malignant cells that have got astray and are distributed throughout the body in unknown positions, eventually forming metastases.

I find the short wave or intensive radiation technique, whether by radium or X rays, not applicable in prophylaxis, for the essential feature of this method is the *local* delivery of a large quantity of *homogeneous* rays, calculated to deliver a certain dose at a pre-arranged depth.

The statistical tables of Portmann, Forssell, and others clearly indicate that the heavy homogeneous radiation should be avoided in prophylactic work. In fact, I think Béclère is probably correct when he states that this technique should be prohibited in these cases.

Pfahler suggested the saturation method some years ago, and with one important modification—namely, the use of a lower scale of wave length—the results without doubt are superior to the heavy radiation method, and to my mind it is the only logical way to radiate with the object of prophylaxis.

A CASE OF IMPENDING VOLKMANN'S ISCHÆMIC CONTRACTURE

TREATED BY INCISION OF THE DEEP FASCIA.

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The treatment of impending Volkmann's ischæmic contracture by free incision of the deep fascia over the antecubital fossa is a well-established procedure. Murphy, in an address which he gave before the American Medical Association in 1914 on the subject of ischæmic contractures,[1] stated that this method of prophylactic treatment should be adopted if removal of bandages and suspension of the arm have failed. Sir Robert Jones [2] referred to the method again in the opening address to the Orthopædic Section of the British Medical Association in 1928. But these and other references [3 4 5 6] to this operation do not give any detailed case reports. Two cases have been recorded in which an open reduction of a supracondylar fracture was performed owing to signs of impending contracture, and I have myself seen another. In the case reported here, incision of the deep fascia only was performed, the fracture remaining unreduced.

A boy, aged 10, was admitted to University College Hospital with a supracondylar fracture of his left humerus, about five hours after the accident. There was a considerable amount of swelling in the region of the elbow-joint; the radial pulse was fairly easily felt, though weaker than that at the opposite wrist. An immediate attempt was made to reduce the fracture. It was not found possible to flex the elbow without obliterating the pulse, and the arm was laid on a pillow in full extension. The next morning, 18 hours after the accident, the pulse was still palpable; a radiogram showed that the deformity had not been corrected. A second attempt, also unsuccessful, was made to manipulate the fragments into position. After this the radial pulse was no longer palpable, but the boy felt no pain in his forearm; repeated observations were made on his finger and wrist movements to make sure that there was no diminution in the activity of the flexor muscles. Forty-eight hours after the accident there was still no pulsation at the wrist, and he began to complain of pain in all his fingers. It was thereupon decided to operate.

A longitudinal incision was made in the middle line over the antecubital fossa, extending two inches up the arm and down the forearm. The subcutaneous tissues were infiltrated with blood; the superficial veins were much engorged. The deep fascia, when incised, split apart about three-quarters of an inch, and the muscles bulged into the gap. The muscle bellies were very pale, but there was no infiltration of blood into them. The wound was left open, and the arm was put on a pillow in a position of nearly full extension.

The next day the radial pulse was still impalpable, and pain and a sensation of pins and needles were still present, but there was a full range of movements of the fingers and wrist muscles. The pulse was first felt 24 hours after the operation, and thereafter gradually became stronger in volume; the sensation of pins and needles gradually diminished, but did not finally disappear until nine days after operation. The wound was sutured five days after the incision. A week later (and a fortnight after the accident) a Kirschner wire was inserted through the olecranon, and traction applied. The deformity was partially, but not wholly, corrected; callus was already visible in the radiogram. Had the wire been inserted at the same time as the incision over the antecubital fossa was made the deformity might have been fully corrected, as the fragment was then still mobile.

The range of movements at the elbow now, nine months after the accident, is: flexion to 90°, extension full. There is no limitation of pronation and supination, and no pain.

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SCURVY FOLLOWING AN ULCER DIET.

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An instance of severe scurvy in a patient under dietetic and alkaline treatment for duodenal ulcer has recently been under my care, and is of considerable interest.

Relatively few cases of this type have been reported. Davidson [1] describes three cases of deficiency disease in patients on an ulcer diet. The disease was characterised by spongy gums, purpura, dental caries, and intramuscular hæmatomata. Mettier, Minot, and Townsend [2] have reported eight cases of scurvy, two of which occurred in patients on special diet. One woman with gastric ulcer developed scurvy after seven years upon a cracker and milk diet. The other was a man who, owing to diarrhœa, was dieted exclusively upon boiled milk, flour, and biscuits. A month later he suffered from acute bronchitis, and this precipitated a mild attack of scurvy, which speedily cleared up when a more liberal diet was allowed. Immermann [3] describes a case of scurvy in a patient with colitis, whose diet had for 11 months been restricted to rice, milk, eggs, white meats, and broth.

A blacksmith, aged 27, was admitted to a general hospital in October, 1930, with a perforated duodenal ulcer which

was sutured under spinal anæsthesia. After a rapid recovery, he was discharged about the middle of November, and advised to take a magnesia mixture before, and alkaline powders after, meals, and to adhere to the following diet:—

Breakfast: tea, and bread and milk with egg, or shredded wheat with milk, or Quaker oats with milk and sugar. Lunch: Madeira cake. Dinner: rice pudding, brown or white bread and butter, madeira cake. (Once a week, steamed white fish.) Tea: two boiled eggs, milk, bread and butter, cake, tea. Sometimes custard, or fish, or jelly.

From November, 1930, until his admission to the Withington Hospital at the end of May, 1931, he rigorously confined himself to this diet. In January, 1931, he was away from work two weeks with influenza, and on recovery he developed pains in the shoulders resembling rheumatism. The pains came and went, were not affected by weather, and when tension was placed upon the joints they became so severe that the patient was unable to move for some minutes afterwards. The ribs were very tender, and hurt when the patient breathed, or pressed upon them. In April the pain shifted from the shoulders to the lumbar region. The gums became swollen and dark, and bled when touched. There was complete loss of hair from the arms, legs, and axillæ; and the hair of the head came out in handfuls. The pain then moved into the thighs, and was so intense that the patient could not stand up straight, and had great difficulty in walking.

On May 26th he was admitted to Withington Hospital. He was then desperately ill. The gums were bluish-white in colour, spongy, and swollen, and bled on the slightest touch. There was a purpuric rash across the back of the shoulders. The petechiæ were raised, hard, and varied up to the size of a split pea. Both popliteal spaces were swollen up with intramuscular hæmatomata, the bluish colour spreading half way down the calf muscles. The knees were flexed, and could not be straightened. The patient was scarcely able to stand, and complained of a sense of tightness of the muscles of the thigh. The blood count was as follows:—

Red cells	5,200,000	Polymorphs.	60·2%
White cells	4,600	Lymphocytes	28·2%
Hb	94%	Large mononucl.	9·0%
Colour-index	0·90	Eosinophil.	2·0%
		Basophil.	0·5%

Slight anisocytosis was seen. Platelets were scanty.

He was prescribed a diet which included 4 lemons, 8 oz. green vegetables, 8 oz. potatoes daily, and an occasional grape fruit. Within ten days he was feeling perfectly normal and fit, and was able to walk. The only remaining evidences of the disease were slight yellowish staining behind the knees, and numerous small brownish blotches on the back, marking the site of the purpuric rash. He was then recommended to continue on diet rich in green vegetables, but from which the acid lemons and grape fruit were excluded.

For four months this patient had been treated as a case of rheumatism; later he had been diagnosed as a case of arthritis with pyorrhœa, and total extraction of the teeth had been recommended. Finally, he had been considered to be suffering from rheumatism with purpura, a course of salicylate baths and massage being prescribed. In view of the obscurity of the early symptoms, it seems probable that slight undiagnosed cases of this type are not uncommon.

Since Mettier, Minot and Townsend consider that the onset of the disease is often precipitated by a febrile infection, it is interesting to notice that in this case an attack of influenza heralded the onset of the scurvy.

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3. Immermann, S. L.: Ibid., 1930, xciv., 1757.

LIBRARIES AND HOSPITALS.—Hampstead Public Library has arranged to supply the non-infectious wards of the local hospitals with books from its reserve stock.

SOUTHAMPTON FREE EYE HOSPITAL.—The Bishop of Southampton last week dedicated a new out-patients' department of this hospital, which has cost about £5000. The number of patients, the majority of whom are out-patients, rose from under 6000 in 1920 to 8421 in 1930.

BRITISH MEDICAL ASSOCIATION.

ANNUAL MEETING IN EASTBOURNE.

SECTION OF MEDICINE.

AT the third meeting of this Section the chair was taken by Dr. E. BOSDIN LEECH, Vice-President, and a discussion on

Toxic Goitre, its Course and Treatment,

was opened by Prof. F. R. FRASER. He said that the three lines along which conceptions of this disease had been altered in recent years were: (1) the correlation of the morbid anatomy of the thyroid with the clinical conditions; (2) the therapeutic use of iodine; and (3) the development of surgical treatment. The varying symptomatology of the disease could partially, though not wholly, be accounted for by variations in the strength of the stimulus, in the capacity of the thyroid to react, and in the state of the organs of the patient. In the elderly a moderate degree of intoxication would produce auricular fibrillation where in a young girl it would only produce a tachycardia. In the same way the vaso-motor system, digestive and excretory organs, and higher cortical functions were far more profoundly disturbed in the elderly.

Iodine reduced the thyrotoxicosis and—together with rest and other measures—brought the patient to an optimum condition for operation in a time that might be much longer than the ten days stated in the literature. When operation was unnecessary iodine was one of the most valuable methods of treatment available. It modified but could not prevent relapses. In fact, it did not reach the cause of the disease but merely altered its effects.

As a result of previous experience he had come to the conclusion that surgical treatment was indicated for patients with nodular goitres and for those who did not improve rapidly, became chronically ill, relapsed, or could not submit to adequate observation and treatment. In the quinquennium 1926–30 he had had 136 patients surgically and 64 patients medically treated. He had classed the results under four heads: good, poor, bad, and dead. Of the surgical cases 44 were good, 20 poor, 2 bad, and 6 dead; of the medical 23 were good, 15 poor, 3 bad, and 23 dead. Even when allowance was made for future improvement, the high proportion of poor results to good results in the surgical group was noticeable. The proportion of poor results increased with the age of the patient and with the duration of the disease. It was not always realised that the longer the thyroid intoxication continued, even if it was mild in degree and interrupted by numerous remissions, the less likely was the patient to be restored to health. In considering prognosis, ætiology must be taken into account. If the causal factor could be removed and the patient brought under early care, there seemed to be a possibility of recovery without operation in mild cases. In ten of the medical cases with good results there had been marked improvement after tonsillectomy; they had all been mild cases associated with attacks of tonsillitis, with an average age of 29 and average duration of two and a half years. The longer the duration the more difficult it was to discover the causal factor. Since the discoverable factors were such as must be experienced by most people in the course of their lives, there must be a constitutional factor as well, and this factor might be inherited and inborn. It could not, however, be recognised in the absence of

the disease. In some patients it seemed to be so strong that no other factor was necessary. The stronger the constitutional element the worse the prognosis, even after thyroidectomy. In some of the "poor" results the patients had given histories of nervousness and excitability all their lives, and seemed to have been below the normal standard of physical efficiency before the onset of toxic symptoms.

Analysis of the results showed that surgery was indicated in most cases severe enough to be admitted to the wards of a general hospital. It was safer to operate at the earliest suitable opportunity than to hope for spontaneous recovery. Some method of reducing the amount of functioning thyroid tissue was essential to save life and restore efficiency. X rays and radium required long courses of treatment, and were uncertain in their results, and operation was preferable, to save time and avoid relapse. The surgeon must be one with special experience of this work. For patients still able to work, treatment by X rays and radium could be begun as soon as the diagnosis was made, and should be accompanied by removal of the causal factor and by iodine medication to reduce the intoxication.

Dr. JOHN EASON pointed out that many patients in alarming or strange circumstances showed a thyroid response which fell short of grave disease. The mobilising function of the gland was in control and the storing function in abeyance for the time being; consequently the gland had to overwork, but the formation of an abnormal secretion was not proved. Among exciting causes he had found emotion and worry in 62 per cent. of cases, though many of the patients at first denied worry because very often the trouble was related to sex. In 20 per cent. the disease had followed very soon after infection —tonsillitis or influenza. The clinical features and histo-pathology naturally varied with the ætiology. There was also a factor of predisposition. Certain endemic conditions, toxæmia, and long strains might predispose the gland to over-response. In the child the development of the autonomic system was inadequate for a response comparable to that known as exophthalmic goitre, but the seeds might be sown in childhood, moulding the active, slender type which resembled the frog produced by feeding tadpoles on thyroid. The female was predisposed by her specific endocrines.

The treatment was primarily medical, though the mortality-rate from operation was not really very high in the hands of an experienced surgeon. Indications for the use of iodine were given by the reaction of the morning and evening pulse-rate and respiration to small doses of potassium iodide. If the swing was flattened out the treatment was satisfactory. The effect of a single dose of grs. 4 of potassium iodide would last four or five days. Radium had produced marked improvement or cure in 24 out of 40 cases, and slight improvement in five more. The treatment only took one day in each two months. The results of medical treatment in Edinburgh were much better than those of Prof. Fraser, the mortality for the last three years being 3·9 per cent. They must refer to a much milder form of the disease.

DEEP X RAY THERAPY.

Dr. E. P. POULTON described the results of deep X ray therapy for toxic goitre. It was important to decide in advance on the line of treatment, as serious adhesions might be produced by deep X rays. Of 14 cases over a year in duration, 64·5 per cent. were able to do their former work and 28·5 per cent. were able to do light work. Similar results had been obtained in other cases not directly under his care. He asked, in view of these figures, why operate? The cases formed a representative series except that only two of them had had auricular fibrillation. The basal metabolism and pulse-rate had gradually fallen as the body-weight had gone up. He stressed the attacks of extreme muscular weakness associated with the disease. The test for it was to ask the patient to stand up on a chair, but many patients would relate that they had to pull themselves upstairs by the banisters.

Dr. W. L. WATT pointed out that the figures for deep X ray therapy compared favourably with the very best surgical results obtainable—those of the Mayo Clinic—and had no immediate mortality. Dr. Poulton's cases had all been treated with medium hard rays. Five cases with post-operative recurrence had shown marked improvement. A sarcoma dose of 80 per cent. was given, and its effect was, to all intents and purposes, a bloodless operation. In moderate cases one treatment was sufficient; in severe cases two were required. Milder cases would recover in two or three months; severe cases needed a year. In very grave cases the treatment was spread over five or six weeks. One case brought up in extremis, after influenza, had had five weekly treatments and had recovered completely. Relapses followed surgical treatment in a number of cases, and here a combination of surgery and X rays was of value.

PRE-OPERATIVE MEASURES.

Mr. JOHN MORLEY pleaded for a rational, carefully thought-out plan of campaign by the doctor in charge of the case. The disease could only be cured by subtotal thyroidectomy or X ray or radium treatment. If X ray therapy was to be safe it must show its effects in a reasonably short time. The milder primary cases should have a trial course, rigidly controlled, for three months. If the results were promising the treatment should continue; if not, the more rapid methods of surgery were the treatment of choice. Rather over one-third of the cases he operated on were X ray failures. The surgeon could promise a cure if the case was not seen too late. The operative risk could be reduced to a minimum by preparatory measures, chiefly the administration of iodine. The first iodine remission was usually the best, and should be the time of operation. Patients should not be put on iodine indiscriminately for several months; it should be held in reserve if there was any likelihood of operation. The next most important preparatory measure was digitalis in heroic doses for cases with auricular fibrillation. There must be an adequate period of physical and mental rest before operation. The diet should be rich in carbohydrates. Every surgeon had his own methods, but Mr. Morley preferred local infiltration anæsthesia for anxious cases, preceded by omnopon and scopolamine in carefully regulated dosage. He had found novocaine and adrenalin safe and efficient. Gas and oxygen must always be available in case local anæsthesia did not suffice. Ether and chloroform were dangerous. Nothing short of subtotal thyroidectomy was curative. The great thing was not to postpone operation so long that irreparable damage was done to the heart muscle.

Mr. W. H. C. ROMANIS declared that the term "toxic goitre" should not be applied to nervous patients with goitres and mild degrees of thyroid toxæmia. He required at least some detectable changes in the eyes and heart. A certain shininess of the cornea and some dilatation of the heart were the earliest signs. In the "primary" type the course

of the disease was more severe and rapid; the "secondary" type was less severe, and the disease seemed to pick out the cardiac system as its main object of attack. These cases were very common among school-teachers and nurses. Medical treatment was chiefly valuable in preparation for operation. Radium applicators occasionally produced marked improvement, but both radium and X rays were notably uncertain. In the majority of cases operation gave the best, quickest, and most certain end-results, but many mild cases did not require it, and a few were too severe for it. The only cases definitely too bad for surgery were those with mental symptoms and intractable heart failure. Auricular fibrillation was not a contra-indication. Children should not be operated on until all other methods had failed. The operation should be early, and should be preceded by rest and iodine for 10–20 days. Thyroidectomy was the only reasonable operation, and the usual mistake was to remove too little tissue. Small isolated portions left might hypertrophy and cause recurrence. Local anæsthesia should be preceded by sedatives, preferably avertin. The mortality was about 3 per cent., and the great majority were greatly improved in the minimum of time. Patients should be warned that the exophthalmos would improve less than other symptoms, and that they must live an easy life for a few months after operation.

Mr. T. P. DUNHILL emphasised the tragedy of the disease, and deprecated the tendency to say that operation was "safe" and "curative," which it was not. In the early stages the treatment should be medically controlled, but that did not mean that the best years of a woman's life should be wasted and operation never offered. He pleaded for earlier coöperation between physician and surgeon. X rays were good in some cases; others were not benefited, particularly very severe early cases and complicated cases. It was soon obvious whether the patient was improving. Operation in good time could send workers back to work and mothers back to their families before their organs were damaged and their capacity for work impaired. Operation should be done on cases with complications that could not be cured, provided the practitioner and patient realised the position. Operation was less crude a method than leaving patients to die or to live with ill-health. Children could not always be left safely; they sometimes died under medical treatment.

Colonel ROBERT MCCARRISON spoke of the malnutritional predisposing factor, and described experimental work on this subject. Hypertrophy and hyperplasia of the thyroid were most easily produced by feeding rabbits on cabbage; the metabolic-rate was not raised until iodine was added. A diet deficient in fat-soluble vitamin A produced a condition of depleted function of the thyroid cells, and the whole gland became flooded with lymphocytes (lymphadenoid goitre). Diet was very important in the treatment of Graves' disease, which was probably more a general disease than one localised to the thyroid. If the patient was going to utilise his carbohydrates, his diet must be balanced in vitamins and mineral salts.

Dr. J. O. SUMMERHAYES spoke of the practitioner's difficulty in getting these nervous patients to go to hospital, and asked what was to be done for early cases by the family doctor.

Prof. RABINOWITZ remarked on the rôle of the sympathetico-adrenal system in the production of this disease. The denervation of the adrenal medulla might play an important part in therapy. Two myasthenic cases had responded remarkably to ephedrine. Useful diagnostic features were the "scoop" nails, the warm, moist, tremulous hand, and the delicate skin—"the skin you love to touch." The nervous goitrous girl had a cold blue hand. Some of the worst cases were due to small nodules behind the sterno-clavicular junction. Bad cases should be treated surgically. Mild cases were best treated by arsenic, quinine, and luminal, and sometimes codeine, but he preferred surgery to radiation.

Dr. FLORENCE STONEY suggested that in early and persistent cases the problem was to find what was irritating the gland: a source of focal sepsis, probably, or a fibroid condition of the uterus.

Prof. FRASER, in reply, summed up the agreed points: that a great deal of research was still required, particularly on the origin of the disease; that some means must be taken to reduce the amount of functioning gland tissue; that surgery was essential for urgent cases; and that radiation must be tried in the future for ambulant cases. He did not think that the use of iodine was limited to pre-operative cases, and urged it in other circumstances.

SECTION OF SURGERY.

ON July 23rd Mr. R. OGIER WARD opened the discussion on recent advances in

Diagnostic Methods in Renal Affections.

Mr. Ward paid tribute to Prof. von Lichtenberg, who was responsible for the introduction of ascending pyelography, the method by which catheters were passed into the ureters from below, enabling opaque media to be introduced into the renal pelves and calices. Instrumental pyelography needed care and practice, but given those conditions it was a safe and accurate method of examination and gave well-defined pictures. He pointed out that the radiograms obtained were of shadows and not of the actual objects, and the extreme accuracy obtained was the more satisfactory. Prof. von Lichtenberg was not only the inventor of instrumental pyelography but had been responsible for the development of excretion urography to its present high efficiency, thereby making a further and valued advance in the diagnostic method of renal affections. Several substances had been tried, but the most successful appeared to be D.40, now known as Uroselectan B. Mr. Ward showed a large number of radiograms which had been obtained during his own researches with this drug, and demonstrated its great superiority over its predecessors. Uroselectan B., he said, was introduced into the vein from the sealed ampoules in which it was supplied. Care had to be taken not to inject it outside the lumen of the vein, although no serious results from such an accident had been reported. None of his patients had experienced any untoward effects after the injection. Excretion urography could never replace ascending pyelography in the investigation of routine urological cases; it was an adjunct to this investigation, and only rarely did it supply information which could not have been obtained by other means.

One of the interesting results brought about by this new method of investigation was the fresh light shed upon the neuromuscular mechanism of the urinary tract; it would therefore be of assistance in the pathology and treatment of hydronephrosis, which disease was the result of a defect in the mechanism. A pyelogram clearly demonstrated a hydronephrosis; excretion urography sometimes showed the same hydronephrosis but of a considerably larger size. The reason for this discrepancy

was that in excretion urography the kidney filled the pelvis at a rate to which it was accustomed, whereas in instrumental pyelography the opaque fluid had been forced through the ureteric catheter much more rapidly and the pelvis had resisted the process. This gave clear proof that the pelvic neuromuscular mechanism was not destroyed, though damaged, and was an encouragement to the surgeon who wished to perform a plastic operation.

The physiology of the pelvis and ureters in a normal subject, although perfectly demonstrated by the excretion of contrast media, required much study. It was easy to recognise obstruction because substances accumulated above it, but in health the drug was quickly swept along in the urine and the calices were not all filled at the same time. For this reason the shadows might be faint ones and were only apparent in first-class radiograms. The radiograms taken immediately after the injection should be studied with particular care, for later an accumulation of gas in the intestine might make interpretation difficult. Much further study was required, but it would not be long before further advances were made by means of serial and slow-motion cinema-radiography. Such processes ought to make clear the dynamics of the urinary tract in health and disease.

Mr. Ward showed radiograms of cases in which excretion urography had been of special value, since it was undesirable or impossible to pass the cystoscope. Such conditions obtained in the presence of a urethral stricture, an enlarged prostate, or in severe cystitis. The passage of a ureteric catheter was not always possible or desirable in ureteric kinking, in urinary tuberculosis, and in the pyelitis of pregnancy. A striking example of its value in a case of ectopic kidney was demonstrated. Excretion urography should be regarded first and foremost as a means of studying the urinary tract as a whole, in a manner hitherto impossible. There was no need to claim that it had made standard methods of investigation of the urinary tract unnecessary; to these methods it should not be regarded as a rival but rather as a supremely valuable ally.

Dr. E. J. H. ROTH emphasised the position of the radiologist in relationship to the urologist, and said that his importance rested on the fact that together with the pathologist he helped to form a urological unit. The apparatus now available had made a standard technique necessary. A good radiogram should not be a matter for congratulation, but an ordinary occurrence. The radiologist could never be a diagnostician, and a diagnosis founded on radiograms alone would be of little value and probably inaccurate. Mr. Roth described the technique of modern radiography in detail, and emphasised the modifications which were necessary in both ascending and descending pyelography. The shadows cast in descending pyelography were of such a nature as to demand the maximum radiographic contrast. He depicted and described a radiographic table designed for the new department of radiology at St. Peter's Hospital for Stone. It enabled radiograms to be obtained in the erect as well as in the more usual supine positions—a valuable factor in pyelography. The preparation of the patient for X ray examination of the urinary tract was described and its importance accentuated. Radiology offered valuable assistance in the diagnosis of lesions in the urinary tract. The patient might consider his renal pictures as the final word in the diagnosis of his condition; to the clinician, however, they must remain no more than aids to his own observation.

Mr. R. J. WILLAN showed radiograms obtained in a series of eight cases in which both ascending and descending pyelography had been carried out. In some of the cases a final diagnosis had been made, and the conclusions had been based upon the results of ascending pyelography; in others the descending method had carried weight in the final diagnosis. Descending pyelography was in its infancy, and much work would have to be done before confidence in its use could be assured. He also had no experience of ill-effects from the use of uroselectan, but he had always been very careful to obtain preliminary information about renal function; to this end he used the pheno-sulphonal dye and the salivary-blood-urea test.

Mr. K. HERITAGE showed a large number of films illustrating the value of descending pyelography in cases of renal tuberculosis. In his opinion the absence of shadow indicated that the patient had been insufficiently prepared, and a subsequent examination should be carried out.

Mr. J. F. DOBSON thought that at first sight the pictures obtained might seem disappointing, but this was only if they were regarded as supplanting those obtained in ascending pyelography. The greatest value of this new method of investigation at present lay in connexion with renal tuberculosis, but it would not be long before descending pyelography became a routine accessory measure in all cases.

Mr. JOHN HUNTER said that he had noticed a general dilatation of the ureter in tuberculous cases investigated by means of descending pyelography, and asked whether this might be considered a diagnostic sign. He had seen no ill-effects in cases of deficient renal function investigated by the intravenous method.

Dr. E. W. M. H. PHILLIPS reported the value of descending pyelography in a case of hydronephrosis.

Mr. A. H. BURGESS made a plea for the adoption of the terms "ascending" and "descending" pyelography to describe the two methods. He pointed out that ascending pyelography was mechanical and not strictly anatomical in its distension of the pelvis and calices, whilst descending pyelography constituted a physiological process. He emphasised the value of negative results.

Dr. R. V. HUDSON referred to a case of Dietl's crisis where no shadow had been seen during the examination shortly after the attack had occurred, but later a well-marked condition of hydronephrosis had become apparent.

Mr. C. A. JOLL commented on the great degree of accuracy now obtained in modern urological surgery. He thought that the future of descending pyelography was assured, especially as a method of estimating renal function, and in very early cases of hydronephrosis.

REPLY.

Mr. WARD, in reply to questions, thought that the absence of shadow in apparently normal cases was due to rapidly functioning kidneys. He did not entirely accept the term "descending" pyelography, since the intravenous injection of the contrast medium enabled the observer to obtain an idea of the condition of the ureter and the bladder as well as of the kidney.

SECTION OF DISEASES OF CHILDREN.

ON July 22nd the section discussed

Jaundice in Childhood.

The opening paper was read by Dr. A. C. HAMPSON, the President, Dr. H. C. CAMERON being in the chair.

After briefly classifying jaundice on the basis of the anatomical lesion present in different types, Dr. Hampson emphasised the fact that age exerts an influence on the susceptibility to liver toxins; the child's liver is more susceptible than that of the adult, though it also shows a greater tendency to repair, and the liver of an infant shows maximal susceptibility.

JAUNDICE IN THE NEW-BORN.

He said that probably all infants at birth showed an excess of bilirubin in the blood. He had found an average concentration of 1 : 75,000, the normal in the adult being 1 : 1,000,000. In a case of "physiological jaundice," if death due to some other cause should occur, post-mortem examination showed staining of cartilage, of cerebro-spinal fluid, and of the nuclei of the brain, parts which are not stained in other forms of jaundice occurring in older patients. After birth there was a considerable amount of hæmolysis and a sharp rise in the amount of bilirubin in the blood up to the third or fourth day, and then a gradual decline. Before birth the fœtus has two possible methods of excretion of bilirubin, through its own liver and alimentary tract, or through the placenta into the mother's circulation. At birth the infant's liver must take on the whole work, and it might be some time before it was able to assume its full functions; this would afford an explanation of the presence of bile salts in the body fluids. Dr. Hampson's observations suggested that hæmolysis leading to "physiological jaundice" might be associated with a difference in acidity between red cells and plasma, such as he and M. Maizels had found in hæmolytic anæmias.

Icterus gravis neonatorum was similar in various respects to benign icterus neonatorum, but was almost invariably fatal if untreated. In this familial disease jaundice might be present at birth or appear within about 24 hours, and would rapidly deepen. The sequence of events was drowsiness, loss of weight, increasing anæmia, often hæmorrhages with bruising and convulsions, and death usually in coma within three weeks. The stools were normal in colour and liver and spleen were not usually enlarged. If in simple jaundice of the new-born there was delayed assumption of hepatic function, then a lesser competency on the part of the liver or an increased hæmolysis in icterus gravis might result in a fatal toxæmia. With a view to decreasing hæmolysis, Dr. Hampson had given human serum intramuscularly, 15 c.cm. daily for three or four days, with the remarkable result that 23 out of 24 cases made complete recoveries. He believed that cases with enlargement of the liver and spleen and pyrexia belonged to another group, and in such cases results had not been as good. He suggested trying mercury inunctions as well as serum in these cases. Jaundice in congenital obliteration of the bile-ducts usually appeared on the second day; meconium was usually passed, followed by pale stools; the liver was large and very hard and the spleen enlarged, and the infant often surprisingly fit till late in the disease; in the terminal stage hæmorrhages usually occurred and sometimes convulsions. Unlike Dr. Parkes Weber, he had found the cerebro-spinal fluid stained in some of these cases. The lesion was undoubtedly progressive, and the speaker favoured the theory that it was due to maternal toxins circulating through the fœtal liver and excreted into the bile-ducts. Though there was no evidence of the existence of syphilis in these cases, he had had results suggesting that mercury inunctions and serum injections might be beneficial also in this form of jaundice.

EPIDEMIC INFECTIVE JAUNDICE (CATARRHAL JAUNDICE).

Catarrhal jaundice occurred usually in epidemics or sporadically, but pandemics had been noted. The virus was so far unknown. One attack appeared to confer lasting immunity, the maximal incidence of infection being between five and ten years in children. The majority of the cases were observed in autumn. It was possible for the disease to occur in association with enlargement of the liver, but no jaundice; the essential lesion was a hepatitis. The duration of the disease was variable, and the liver might remain enlarged for weeks after all jaundice has disappeared. Occasionally cases suddenly took on grave characters and pursued the course of acute necrosis. Cases of catarrhal jaundice must be regarded as infectious, both before the jaundice had appeared and for some while after it had subsided. A running ear appeared to have been the source of infection in some cases. During epidemics the incubation period was usually 21 to 28 days. Dr. Hampson condemned the use of atophan for this condition. Where commencing cholæmia with necrosis of the liver was suspected he suggested the administration of intravenous glucose and insulin, and perhaps calcium gluconate.

Dr. J. C. SPENCE pointed out that epidemic jaundice in England was not due to the leptospira-ictero-hæmorrhagiæ. The infective agent was probably ultra-microscopic, and the usual incubation period perhaps four weeks. He described the development of the disease in a laboratory worker in whom the incubation period appeared to be five weeks. In the epidemics of so-called "camp jaundice," which he had seen in Gallipoli during the war, just as in the epidemic among the civil population in a part of Sweden in 1924–26, there were occasional cases of necrosis of the liver. In a recent small epidemic which he had been able to observe there were 19 cases of ordinary "catarrhal jaundice" and one fatal case of necrosis of the liver. Tests devised to estimate hepatic function in catarrhal jaundice gave variable results, but probably some of the normal results were due to the tests being carried out during the stage of recovery. In his view it was very important not to overtax liver function in this disease, but to feed the patient on easily assimilable carbohydrates. The symptoms of cholæmia should be more widely known, and Dr. Spence described the case of a boy of nine who showed restlessness, "cholæmic" wailing and shrieking, and nervous symptoms, including changes in reflexes and convulsions, characteristic of such cases. The association between jaundice and signs of derangement of the nervous system was of great interest. As Dr. Hampson had said, diplegia and other evidence of lesion of the nervous system might follow severe types of jaundice in the new-born, and the mental depression occurring with jaundice had had such wide recongition that it had even originated the word "melancholia."

LABORATORY TESTS.

Dr. W. W. PAYNE described the results of fragility tests for the red blood corpuscles in hypotonic saline, pointing out a very slight tendency to resist laking found in some cases of jaundice in childhood. The test had, of course, its chief use in the diagnosis of acholuric familial jaundice, but it must be remembered that the cells in this disease did not always show increased fragility, and that laking might occur within so-called normal limits. In doubtful cases the test should be repeated several times, and the result of the van den Bergh reaction taken into consideration. In none of his cases did the van den Bergh test yield

normal results. As to liver function tests, he held that these gave little help in diagnosis, but might be of much value in the study of a disease; he had employed them in the study of asthma. In this disease, according to the lævulose test and the adrenalin test, liver function was not infrequently deranged.

The pathogenesis of

CONGENITAL ATRESIA OF THE BILE-DUCTS

was discussed by Dr. H. CHODAK GREGORY. She described the case of a premature infant with the symptoms of this disease. It died when about five weeks old; the liver showed no cirrhosis, and had scarcely any periportal bile-ducts, though bile capillaries were present and were gorged with bile and the extra-hepatic bile-ducts were patent. She believed that in this case the obstructive jaundice was due to a developmental failure of these periportal ducts, and suggested that the cirrhosis usually found post mortem might well be the result of the obstruction to the flow of bile. The known facts concerning the complicated development of the biliary system, and the occasional occurrence of other congenital abnormalities with atresia of the bile-ducts, favoured the view that the condition was in all cases a developmental anomaly.

DISCUSSION.

The PRESIDENT commented on the points of resemblance between the terror-stricken looks and screams of the child suffering from cholæmia, and the symptoms of the child with "night terrors." It was this resemblance which had first led him to employ glucose in the treatment of the latter condition, a treatment which certainly produced good results.

Among subsequent speakers, Dr. H. M. M. MACKAY mentioned the occurrence of types of jaundice in infants which it was difficult to classify under any of the accepted text-book heads. Dr. A. MONCRIEFF and Dr. C. F. HARRIS discussed the cause of hæmolysis of the blood and the consequent physiological jaundice in the new-born. Dr. E. H. RAINEY mentioned some of the contra-indications to operation, either in congenital obliteration of the bile-ducts, or in any case of persistent jaundice of the catarrhal type. Dr. E. GUNN described an epidemic of catarrhal jaundice in New Zealand, and Dr. J. HUTSON described the high incidence of physiological jaundice of the new-born in Barbados.

REVIEWS AND NOTICES OF BOOKS

Clinical Observations on the Surgical Pathology of Bone.

By DAVID M. GRIEG, M.B., C.M., F.R.C.S. Edin., F.R.S.E., Conservator of Museum, Royal College of Surgeons, Edinburgh; formerly Surgeon, Dundee Royal Infirmary. Edinburgh: Oliver and Boyd. 1931. Pp. 248. 30*s*.

Surgical Pathology of the Diseases of Bones.

By A. E. HERTZLER, M.D., Surgeon to the Agnes Hertzler Memorial Hospital, Halstead; Kansas Professor of Surgery, University of Kansas. London: J. B. Lippincott and Co. 1931. Pp. 270. 21*s*.

IT is an achievement for any author to retain the interest of his readers almost from cover to cover. Mr. Grieg certainly does this in his book, in which he sets out to simplify the conception of bone affections. Yet when we reflect on its contents we find ourselves inquiring in what respect light has been thrown upon osseous pathology. It is a book with one idea; much generalisation is done from the simple observation that hyperæmia often accompanies bone absorption, and that diminished blood-supply, when calcium is available, accompanies bone formation. There are no facts brought forward to support this hypothesis. Local concentration of calcium is postulated as necessary for bone formation, but the author provides no evidence that there is actually increase of calcium in the soft tissues in the vicinity of a fracture. He does not tell us of the possible part played by phosphatase, by glucose or the parathyroid glands. We read that the neck of a fractured femur when broken is absorbed because of increased blood-supply, that osseous union would occur when this dies down, were it not that "fibrinous exudation and the local excess of calcium is wasted by falling into the articular hæmosynovial effusion." The explanation of the formation of true bone in a laparotomy scar on page 15 is ingenious and full of interest, and is a good example of how the reader's attention is fixed and retained. On page 75 there is a fanciful explanation of the so-called expansion of bone. By decalcification the bone is said to become a softened tube, and inflammatory hyperæmia and exudation is held actually to distend it. The explanation of bony secondaries in sarcomata on page 240 is quite startling. The pictures of specimens of dried bones are extremely well executed, and the production of the book does credit to the publishers.

It cannot be said of Dr. Hertzler's book that it holds the interest of the reader. It purports to treat, in a comprehensive manner, the pathology of diseases of bone, and the author confesses that all his resources have been invoked in its compilation. It is the more to be regretted that the result is disappointing. The work provides but meagre information on quite common affections; for instance, rickets is dismissed in eight lines, whilst scurvy occupies but six. Achondroplasia, it is true, is a rare disease, and not of much surgical importance, but it would seem to deserve more than four lines, if worthy of mention at all. In the account of exostoses no reference is made to hereditary proclivity or to the views put forth by Sir Arthur Keith; while the recent work which has done so much to enlighten the pathology of osteitis fibrosa finds no place.

These random examples of defects have been cited in order to justify the criticism of this book as one which fails to reach the average standard of modern surgical literature.

The Mental Defective.

By RICHARD J. A. BERRY, M.D., F.R.C.S., F.R.S.E., and R. G. GORDON, M.D., D.Sc., F.R.C.P.E. London: Kegan Paul, Trench, Trübner and Co., Ltd. 1931. Pp. 196. 8*s*. 6*d*.

IN a preface, the authors state that they have written this book in response to the demands of representatives both of the medical and lay public for a small popular work which would elucidate the growing problem of mental deficiency as seen in its legal, magisterial, social, and educational aspects. They have produced a readable and vigorous book, which, in under 200 pages, touches upon a wide

range of subjects. In the compass of eight chapters, they discourse upon the evolution, anatomy, histology, and physiology of the central nervous system, the nature of instincts, the legal and medical approaches to the problem of defectiveness, the principles of heredity as applied to animals and man, the relationship of mental defect to other forms of illness, and the social consequences of mental deficiency. And in the last chapter they advance a remedial policy.

In their treatment of the subject from the medical aspect, the writers stress their belief that the essential characteristic of mental deficiency consists of a paucity of brain cells. This, they hold, reveals itself in a tendency towards microcephaly, observable in two-thirds of all mental defectives. In fact, such universality is attributed to this characteristic that they consider that "the time has surely come when 'microcephaly' as a 'type' of mental deficiency should disappear from medical text-books."

In approaching the question from the social aspect, a strong plea is made for an evaluation of mental deficiency in terms, not of scholastic educability, but of adaptability and social efficiency. The system of the self-supporting colony is advocated, not only for the four legally recognised categories of defectives, but also for a fifth group of "borderline normals" of a mental ratio of round about 70. For this group, a period of residence in a "therapeutic colony" is advocated. Here the doubtful case would, for a period, be retained under observation, with a view to determining his fitness for ultimate certification or eventual freedom.

Throughout the book emphasis is laid on heredity as the most important single and discoverable cause of mental deficiency, and control of immigration, more discriminating marriage laws, a quickened eugenic conscience, sexual segregation, and sterilisation are recommended as preventive measures.

The book contains much that will provoke dissent, and much that will arouse social and religious prejudices. It also runs counter to orthodox teaching on many points. It will probably commend itself to many who are dissatisfied with the sociological results of the methods of tackling the problem which have hitherto found favour, and will stimulate to fresh energy those who are convinced that these are on the right lines.

Étude clinique de la tuberculose infantile.

By JEAN LEVESQUE, Médecin des Hôpitaux de Paris. Paris: Masson et Cie. 1931. Pp. 150 and plates. Fr.22.

IN this small handbook the author has attempted a general survey of infantile tuberculosis in its clinical aspects. After a preliminary chapter on ætiology and pathological anatomy, he deals with primary infection and reinfection, and surveys, at some length, the well-known signs of infantile tuberculosis; he then goes on to discuss the modern methods of diagnosis, such as radiology and tuberculin testing. The last two sections are devoted to an exposition of the differential diagnosis and prognosis of infantile tuberculosis. The book closes with a small collection of well-reproduced radiograms.

The book is written in clear, interesting style, and, in spite of the fact that he has covered a very large amount of ground in the space of 150 pages, the author has succeeded in avoiding the errors of condensation which so frequently make this kind of book dull reading. Recent works, such as the Mantoux test with tuberculin and the researches of the French school of bacteriologists on the filterable virus in relation to heredity, are described, and the various modern treatments, such as ultra-violet rays, heliotherapy, B C G vaccine, are briefly touched upon. On this last point the writer is guarded in his views, and has managed to keep the question within the limits of a few short paragraphs. It is rather a pity that the brief statistics given towards the end of the book are not more recent, especially when there is such a wealth of material nowadays to choose from. A short, wisely selected bibliography, and a subject-index would have enhanced the value of the book considerably.

Prosthetic Dentistry.

By IRA GOODSELL NICHOLS, D.D.S., Lieutenant-Commander, Special Lecturer and Instructor in Dental Prosthesis, Dental Department, United States Naval Medical School. With many collaborators. London: Henry Kimpton. Pp. 687. With 830 illustrations. 50*s*.

DENTAL prosthesis more than any other branch of dentistry has become the battlefield of a large number of theories on occlusion and the movements of the condyles in mastication. Many highly elaborate instruments have been devised to imitate the condylar path; most of the theories are based on hypotheses which still require proof. Prosthetic dentistry has not received so much attention as other branches in the current literature on dentistry, although its practical importance is even greater than any other branch of operative dentistry. This volume, which is written by 45 dentists, illustrates both the merits and demerits of a composite work. Consisting as it does of a large number of sections, the reader loses the straightforward presentation of the subject which is possible when such a book is written by one man. On the other hand, few dentists can be equally knowledgeable in all branches of dental prosthesis, so that the work gains by the collaboration of a large number of experts. In this case we doubt if the gain compensates for the loss. The book is good in many respects; it is well written, beautifully illustrated, and, on the whole, clear; but it is a little disjointed. Dental prosthesis is essentially a practical subject. It calls for precise work, and needs craftsmanship. Such a subject requires to be methodically treated in sequence of the order of the work, so that the reader can readily follow the technique described. The various sections are good, but a certain lack of editorial control is apparent. Too much latitude has been given to the exponents of different methods, with the result that the reader is likely to be confused rather than edified. Moreover, so much space has been devoted to the more abstruse side of dental prosthesis that some of the more practical aspects are cursorily treated. Springs for the retention of complete dentures are no longer used to the extent common in the past, but they still have their place. Yet the only account of them given here is in the section devoted to restorations of deformities of the jaws following operation, and consists of but a few lines. The dentist desirous of learning the practical points involved in the fitting of springs in a full set of dentures would consult these pages in vain.

The book contains much that is of value, but it must not be regarded as a complete text-book of dental prosthesis. It is essentially one for the practitioner rather than for the student.

THE LANCET.

LONDON: SATURDAY, AUGUST 8, 1931.

ECONOMY IN THE SOCIAL SERVICES.

THE report[1] of the Committee on National Expenditure, appointed last March by Treasury minute with Sir GEORGE MAY as chairman, faces the disagreeable fact that public expenditure is too high and must be brought down to a lower level. The policy of retrenchment after the war was replaced in 1924 by a policy of expansion and development which added about 130 million pounds to our national expenditure as compared with that of seven years ago. Housing schemes, extended old-age pensions, beet sugar subsidy, widows' pensions, naval building programmes are only a few items in a long list. To the extent of about 20 million pounds a year we are now leaving posterity the cost of providing our own generation with these benefits. Future revenue is being mortgaged in spite of the practical certainty that by reason of the change in the age of our population the workers of the future will have to support a larger proportion of pensioners. The committee fears that the mass of the electorate does not appreciate the true economic position of the country, the struggle between expansion and retrenchment at election times always being heavily weighted by the better organisation of those who desire increased expenditure on particular objects.

Looking round for victims the Committee regards it inevitable that the chief opportunities of reduction should be found in the services of most rapid and recent growth. Although they attempt no definition of the category of social services, it is admitted that about 80 million pounds of the increased expenditure of the last seven years can be ascribed to their development, whether under government administration or control of local authorities. The majority report, signed by four members and the chairman, frankly gives the enormous increase in the exchequer charge for these services as the prime cause of the present financial crisis. Had it been possible to make sufficient reduction in other fields of expenditure they would gladly have been content with comparatively minor adjustments in this field. But after curtailing unemployment benefit, docking teachers' salaries, cutting down the road fund, and putting back army pay to the 1925 level, they are still obliged to suggest economies under the heading of national health insurance and of the maternity scheme which are peculiarly unwelcome to the profession of medicine. The lion's share of saving on the former is to come out of the pockets of the doctors, and the Committee is unanimous in suggesting a reduction of the capitation rate. Paragraph 409 runs as follows:—

> We are however of the opinion that the payments to the doctors are too high in present circumstances. These consist of a flat capitation allowance of 9*s.* per annum for every insured person in a doctor's list in addition to mileage allowances in rural areas, amounting in the aggregate to £250,000 and equivalent on the average over the whole of the medical panels to about 4½*d.* per insured person. It is common knowledge that the standard of remuneration of the medical profession has been greatly increased as a result of the Health Insurance Scheme and there has been growing difficulty in filling salaried medical posts under the Government and the local authorities at rates of pay corresponding to those in other classes of public service. In present circumstances we should not regard a reduction of the capitation rate to 8*s.* as unreasonable. This would represent a saving to the scheme of about £750,000 and enable it to meet the cost of central administration to this additional amount.

The suggestion of difficulty in filling salaried medical posts is, we find, a little belated. Like everything else the value of panel practices has been declining, and many recent appointments to government services have been filled by candidates who have disposed of practices with large panels because they have become less remunerative. The other economy suggested is the elimination of the grant of a quarter of a million pounds to the central fund which enables the less fortunate approved societies to pay their prescribed benefits, although an extended application of the principle of pooling of benefits is regarded as very desirable. The richer societies are in a position to maintain their additional benefits, and even to extend their scope, while other societies are in danger of being unable to maintain even the statutory rates of benefit. The chief factor in this difference is, in the Committee's view, not good or bad administration but differing health and unemployment risks of the members in the separate societies.

The maternity scheme is dismissed in the majority report as unduly ambitious in scope and containing the undesirable principle of differentiation between those who belong to the state insurance scheme and those who do not. The probable exchequer charge for this scheme of 1½ million pounds cannot be justified in the present financial circumstances. But to this economy the two Labour members of the Committee are dissentient, regarding the scheme as a bare minimum of requirement to meet the disturbing facts revealed in the departmental committee's report. They recall the fact that it was only in 1926 that the exchequer grants to insurance funds were reduced by a sum substantially larger than the annual additional charge necessary to provide these maternity services. As to health insurance the minority report agrees that provision should be made from within the insurance fund to maintain the statutory rates of benefit, if necessary by a direct levy on the disposable surpluses of societies. The two signatories possibly overlook the fact, made clear in the main report, that these surpluses are the property of the members, representing a reserve consisting of the excess value of the contributions made by each person in his early years over the

[1] Cmd. 3920. H.M. Stationery Office. 4*s.*

benefits received by him. In the case of both majority and minority reports the proposals are made with frank regret that it is not possible to arrange for all classes of the community to suffer an all-round reduction of income. The majority report revolts from singling out public servants and pensioners from the rest of the community for special sacrifice; the minority report turns to an adjustment of taxation in relation to the uncovenanted benefits, now being received by the holders of fixed incomes, as a direction in which further hardship may be avoided to those least able to bear it.

THE MEANING OF "DENTAL SURGEON."

THE connotation of "dental surgeon" is presumably a question of fact. The question has just been answered by Mr. Justice Farwell in the Chancery Division. Leave to appeal against this important decision has been granted.[1] In order to appreciate the importance of the case it is necessary to remember that the titles "dentist" and "dental practitioner" are statutory descriptions. Provided that he is on the register, a dentist may use them whether or no he has a degree or diploma. There is a third description, "dental surgeon," which is not mentioned in the Dentists Acts, but is widely understood to imply the possession of degree or diploma. If this understanding is sufficiently well founded, any registered dentist who calls himself a "dental surgeon" without possessing a degree or diploma offends against Section 4 of the Act of 1921; he is using a title or description which, in the words of the section, is reasonably calculated to suggest that he possesses a professional status or qualification other than the professional status or qualification which he in fact possesses.

In the recent Chancery proceedings, the Attorney-General, on the relation of the British Dental Association, brought an action against a dentist practising at Norwich. The defendant possessed neither degree nor diploma. The Attorney-General asked for a declaration that the defendant's use of the title "dental surgeon" was reasonably calculated to suggest that he possessed a professional status or qualification which he did not in fact possess; he also asked for an injunction to restrain the defendant from using the title. The defendant pleaded that he was entitled to use the description. The plaintiffs called several witnesses practising as dentists in various parts of the country, who said that to them the title "dental surgeon" implied a decree or diploma; they had known "1878 dentists" who used it but no "1921 dentists" other than the defendant. The Secretary of the Incorporated Dental Society, and other witnesses for the defendant, said that all persons practising as dentists in industrial districts called themselves "dental surgeons"; if they had degrees they indicated the degrees on their signs. "Dental surgeon," they said, meant no more than dentist. Counsel for the defendant pointed to the use of the words "dentistry" and "dental surgery" in the 1878 Act as if they were synonymous. He argued that a man qualified to practise dental surgery might reasonably call himself a dental surgeon; the "1878 dentists" used the title "dental surgeon" though they had no degree. Mr. Justice Farwell granted the declaration and injunction in the terms of the application. He inferred from the evidence that to many people "dental surgeon" had a definite meaning and that to many it had none. He could not neglect the evidence for the plaintiffs. The question of the title of "dental surgeon," he said, had been a moot point before 1921: if the legislature had meant the title to be used by the newly registered class, it could have inserted the title in Section 4 of the 1921 Act, along with "dentist" and "dental practitioner."

Many who recall the genesis of the 1921 Act would deem it unfortunate indeed if this decision should be overruled on appeal. The need of proper care and treatment of the teeth is by no means fully realised by the public, though the lesson is being steadily spread. If the necessary recruits are to be attracted to the dentist's profession, it is a mistake to neglect or obscure the evidence of the student's training. The profession has had to fight for its standards. There has been a long struggle against the ingenious use of unjustified titles and descriptions. The Act of 1921 was not ungenerous to persons previously unregistered. Sir Norman Bennett had explained to the Acland Committee, whose report led to the passing of the Act, that many existing practitioners deemed it inequitable to take away their exclusive right to the title of "dentist" and to give that title to persons then not on the register. But it was hard to invent an alternative description. He realised, he said, that persons on the register must have some title or other, and he could suggest nothing but the dictionary word "dentist." Little mention was made to or by the Acland Committee of the description "dental surgeon." But, then as now, those who are in the best position to know have no doubt that the description has a special meaning. If it really has no meaning at all, perhaps there would be less inclination to usurp it.

[1] A verbatim report of this important case will appear in the next issue of the British Dental Surgeon, the Journal of the British Dental Association.

THE RENAL LESIONS IN BRIGHT'S DISEASE.

BRIGHT'S method, his great legacy to medical science, was the explanation of disease by a reference to morbid anatomy. This is the ideal which the authors of an important monograph[1] recently published have set before themselves. It contains the results of a combined investigation by a physician, Prof. THOMAS ADDIS, and a pathologist, Prof. JEAN OLIVER, of 72 cases of Bright's disease, in an attempt to correlate the clinical manifestations of the disease with the structural alterations occurring in the kidney. Impressed, as many others have been, by the relative failure of the study of renal function to

[1] The Renal Lesions in Bright's Disease. By Thomas Addis, Professor of Medicine, Stanford University; and Jean Oliver, Professor of Pathology, Long Island College of Medicine; formerly Professor of Pathology, Stanford University. New York: Paul B. Hoeber. 1931. Pp. 686. 170 full-page plates. 21 text illustrations. $16.00.

solve the problems of nephritis, the authors have eschewed all but the simplest functional tests and have relied for their diagnosis of the clinical condition of the patient on the case history, the physical examination, and the study of the urinary deposit. Prof. ADDIS has already shown how illuminating the study by an expert of the urinary deposit may be, and in the present work he constantly emphasises its importance. He insists that the clinical intuition which is so important in other branches of medical practice constantly fails when applied to the complex condition known as Bright's disease so that even masters of the art are frequently misled.

"They are misled because of the great variability of the manifestations of Bright's disease in the different tissues and organs of the body, so that it is seldom safe to deduce the state of the kidney from observations on the vascular, hæmopoietic, or nervous systems, or wise to form a judgment as to the predominant renal lesion even from the sum of all that by means of present clinical methods is seen, felt, or surmised. But, principally, they are misled because for many years they themselves have ceased to study the urine which comes from the diseased kidneys of their patients. They deal only with symbols transmitted to them by hurried and machine-like technicians, although within that urine which they never see is contained all the direct evidence as to the nature of the renal lesion."

Prof. ADDIS's method consists essentially in the determination of the functional capacity of the kidney, or the extent of the renal lesion by a comparison of the rate of urea excretion with the blood-urea concentration; and an estimation of the nature of the renal lesion by the amount of protein excreted and the examination of the urinary deposit. To be of value the urine examinations must be controlled and carried out by an expert. Inasmuch as protein, casts, and blood occur in the urine of healthy people, the diagnosis of Bright's disease becomes a quantitative one and rests upon the demonstration of larger quantities of protein and casts than occur within the range of normality. The need for accuracy in the investigations is, therefore, of the greatest importance, and this is especially so in the examination of the urinary deposit, for casts and cells vary in form and number with the concentration and reaction of the urine, and the red corpuscles which are the key to the situation may be so distorted as to escape recognition by anyone but an expert in this technique. Moreover, as Prof. ADDIS frankly says, the method has its limitations. The formed elements of the urine merely represent waste products of active lesions and give no indication of the important progressive or proliferative changes which may be taking place in the kidney.

The pathological side of the investigation, carried out by Prof. OLIVER, has been strictly limited to the examination of the diseased kidney itself, for the renal lesion in Bright's disease was the subject of the investigation, and, moreover, in many cases only the kidneys were available for study. Inasmuch as the clinician considered both the nature and the extent of the renal lesion, it might be expected that the pathologist would do the same, but, as Prof. OLIVER points out, such a procedure at the present time is practically impossible. A qualitative histological study is comparatively easy, but a quantitative estimation of the renal lesions expressed in terms of functional capacity is an entirely different matter. It is easy, for example, to distinguish an inflammatory process in a glomerulus, but we have no means of determining how its power to excrete water is affected thereby. Prof. OLIVER has, therefore, limited himself to an objective description of the lesions he has observed, but his valuable chapter on pathological definitions suggests that had he been content to follow a less austere method he could have wandered far in the realms of theory.

As the result of his observations Prof. ADDIS has arrived at the following classification of Bright's disease: hæmorrhagic Bright's disease, of which the initial, latent, active, and terminal stages can be recognised; degenerative Bright's disease, including the cryptic, pyogenic, non-bacterial, and bacterial forms; and arterio-sclerotic Bright's disease; and the cases are grouped under these headings. The history and relevant clinical details of each case are given at length, and there is a brief discription of the naked-eye appearances of the kidneys and a detailed report on their microscopic structure. But the feature of the case records are the illustrations—the structure of each kidney is illustrated by two photomicrographs, one of a magnification of 20, the other of 125, so that the reader is able to see for himself the actual lesion associated with the clinical condition described. There are 142 of these plates, and they are admirably reproduced—the lower magnifications are sometimes a little difficult, but with careful study they will be found to fulfil the purpose claimed for them. These plates are not illustrations in the ordinary sense of the term; they "were not chosen to elucidate the text, but rather the text supplements, in its insufficient way, the actual images, as near as may be, which we had before us in our study." There are, however, in addition, 26 high-power drawings of frankly selected specimens chosen to illustrate the text. The book is concluded by short chapters summarising and correlating the clinical and pathological data.

It would be almost impertinent to offer praise to such an admirable example of what can be achieved, without dogmatism or bias, to clarify one of the most complicated problems in medicine.

ORTHOPÆDIC HOSPITALS.—A new orthopædic hospital, to cost about £30,000, is to be erected in conjunction with the Royal Victoria Infirmary, Newcastle-on-Tyne. On the ground floor will be demonstration and lecture rooms, consulting rooms, a gymnasium, accommodation for hydrotherapy, a sunlight ward, a radiant heat ward, massage rooms, and dressing rooms. Wards for patients and accommodation for sisters will be on the first floor, the second floor will be given over to wards for the reception of women and children patients, and the third floor will include an operating theatre, plaster room, and store rooms. From each ward there will be access to sun balconies, and the flat roof will be used as a roof garden, for treatment of patients in the open air.—Mr. H. J. Alpass, M.P., recently opened a new out-patient department of Bristol Orthopædic Hospital to meet the demand for accommodation. Out-patient attendances have grown from 4137 in 1912 to 13,456 in 1930; in addition, there were 3305 attendances at the Bedminster branch. The work has cost £5500.

ANNOTATIONS

CLINICAL TRIALS OF NEW REMEDIES.

THE Medical Research Council announce that they have appointed a Therapeutic Trials Committee, as follows, to advise and assist them in arranging for properly controlled clinical tests of new products that seem likely, on experimental grounds, to have value in the treatment of disease :—

Prof. T. R. ELLIOTT, Physician to University College Hospital, London (Chairman).

Sir E. FARQUHAR BUZZARD, Regius Professor of Physic, University of Oxford.

Dr. H. H. DALE, Sec.R.S., Director, National Institute for Medical Research.

LORD DAWSON OF PENN, President, Royal College of Physicians, London.

Prof. A. W. M. ELLIS, Physician to the London Hospital.

Prof. F. R. FRASER, Physician to St. Bartholomew's Hospital, London.

Sir JOHN PARSONS, Ophthalmic Surgeon to University College Hospital, London.

Dr. J. A. RYLE, Physician to Guy's Hospital, London.

Sir JOHN W. THOMSON-WALKER, Consultant Urologist to King's College Hospital, London.

Mr. WILFRED TROTTER, Surgeon to University College Hospital, London.

Prof. D. P. D. WILKIE, Surgeon to the Royal Infirmary, Edinburgh.

Dr. F. H. K. GREEN (Secretary).

Conditions have been the subject of discussion and agreement between the Medical Research Council and the Association of British Chemical Manufacturers, under which the Therapeutic Trials Committee will be prepared to consider applications by commercial firms for the examination of new products, submitted with the available experimental evidence of their value, and appropriate clinical trials will be arranged in suitable cases. The Committee will work in close touch also with the existing Chemotherapy Committee, who are engaged for the Medical Research Council in promoting researches aimed at the discovery and production of new remedies.

The Therapeutic Trials Committee will invite suitable experts in particular branches of medicine or surgery to undertake the clinical tests of preparations accepted for trial. The reports of the results will be published under the authority of the Committee.

THE TRANSMISSION OF CHOLERA.

DURING the 50 years 1877–1927 there was no striking reduction in the recorded mortality from cholera in British India, and no decline in either the frequency or intensity of epidemics. Stricter and more energetic control has had to contend with improvement in transport and consequently wider spread of infection, and the mortality is still round about 300,000 per annum. This comparative failure has led Lieut.-Colonel C. A. Gill and Dr. R. B. Lal to undertake a detailed study of the epidemiology, and they have done so from a new aspect.[1] They started with a working hypothesis that the house-fly is a link in the chain of infection—not merely as a mechanical agent in the pollution of food and drink, but as a true biological carrier in which the cholera vibrio undergoes development. Dr. Lal, who was responsible for the laboratory work, found that the vibrio seemed to disappear from the body of the fly after 24 hours, only to reappear about the fifth day, when the fly was infective through its fæces. He and Colonel Gill are not yet convinced, however, that any part of the life cycle is passed in the fly, and their theory is so far only a theory, though an interesting one. The bulk of their paper is devoted to an account of cholera epidemics in the Punjab from 1924 to 1929. They distinguish two different types of outbreak—a "protracted" type, with slow onset and diffuse distribution, and an "explosive" type which is sudden, sharp, and circumscribed. The difference may be put down either to changes in virulence or to dissimilar modes of transmission. As a sidelight on native lack of sanitary sense, they mention a case where the clothing of a traveller, who died of cholera in a hitherto uninfected village, was washed in the well which provided the main water-supply, with the result that within 24 hours there were 180 cases with 16 deaths. Efficient control is inevitably difficult in circumstances like this, but Gill and Lal think that cholera is not permanently endemic in any part of the Punjab, and that imported cases from the United Provinces and Hardwar are mainly responsible for periodical outbreaks. Cases also arise from the Himalayan region, where cholera may persist throughout the winter and break out in epidemic proportions in the following spring. "Acute" carriers are, in their opinion, much more often responsible for outbreaks than "chronic" carriers. It appears that water-borne infection is comparatively rare in the Punjab; indeed, it is said to account for only 2·5 per cent. of all outbreaks. It is significant that no great fall in the cholera death-rate has followed the installation of piped-water suppliers. The investigators are convinced that the institution of an efficient collection and disposal system for night-soil is of prime importance in the control of the disease.

[1] Indian Jour. Med. Research, 1931, xviii., 1255.

THE AGED HEART.

ALTHOUGH the expectation of life has been appreciably lengthened in recent years, most of this gain has been made by the decrease in infant mortality and it hardly affects the outlook in adult life. Since a large proportion of the deaths of older members of the population are certified as due to heart disease much interest attaches to F. A. Willius's investigation[1] of the heart in an unselected group of patients aged 75 or more. Although it is now generally considered that the normal blood pressure does not vary much from youth to old age, three-quarters of the 700 men and women studied had a systolic blood pressure of over 140 mm. of mercury; in only 10 per cent., however, was this over 200 mm. and in only 40 per cent. did the diastolic pressure exceed 90 mm. Further the majority of those with hypertension were in the younger age-groups (75–80). Hence one may say that while in old age a certain amount of hypertension is the rule, a normal blood pressure is favourable to still longer life. Fifty-five per cent. of the subjects showed clinical evidence of heart disease, and in almost all of them it was diagnosed as being either hypertensive or coronary in origin. The majority of those with signs of coronary disease suffered no anginal pain and in the whole series there was only one case of coronary thrombosis. This is in accord with other evidence that coronary thrombosis is commoner in younger people and suggests that those living beyond the normal span of life have coronary arteries with such a free anastomosis that

[1] Willius, F. A.: Amer. Jour. Med. Sci., July, 1931, p. 1.

arterio-sclerotic changes are comparatively easily compensated. The fact that only 12 per cent. of the whole group had congestive heart failure is further evidence that the heart that permits its possessor to live for more than 75 years is indeed an organ of peculiar quality.

INTERNATIONAL UNION AGAINST VENEREAL DISEASE.

REPRESENTATIVES of 44 countries, members of either a Government, or of venereal disease departments, or of voluntary organisations recognised by Governments, form, it may be known, the Union Internationale contre le Péril Vénérien, and this body has for the past year been reviewing the general position in civilised countries with regard to venereal disease. The scope of the various schemes is seen to vary considerably, the complete scheme adopted in our own country contrasting with the more limited endeavours to arrest the spread of syphilis only. There has been considerable controversy on the Continent as to the extent to which State funds ought to be expended in the treatment of venereal disease. Scandinavian countries, for example, advocate the taking over by the State of the treatment of the patient until cure can be considered complete—this in the interests of preventive medicine. Other countries hold that measures to ensure the immediate disinfection of patients is all that the State ought to be required to provide. Reports have now been presented to the Union Internationale by Profs. Bayet, Jeanselme, and Jadasohn, resuming the general principles of antivenereal campaigns from social and individual points of view, with the result that the Union has decided to ask Governments, public authorities, and antivenereal associations to bring certain cardinal conclusions before the medical profession in their respective countries. These conclusions are as follows: that the contagiousness of the patient must be reduced in duration by immediate and intensive treatment, to be continued until the chances of reappearance are removed; that congenital syphilis must be met by systematic inquiry into family circumstances as well as by examination of patients, treating not only congenitally diseased children but parents before procreation, and the mother during pregnancy. The soundness of the conclusions is obvious, and the British Social Hygiene Council has requested their publication by the medical press of this country, as a proof of the practical interest now manifested throughout Europe in the endeavours to avert a social menace.

ESCAPE FROM SUNK SUBMARINES.

THE catastrophe of the submarine *Poseidon* has drawn general attention to the possibilities of escape with the aid of a respiratory apparatus. The principle underlying the submarine respirators—of which there are many patterns—is that the chief danger to be avoided is rapid decompression, with resulting air embolism causing paralysis or death. At a recent meeting of the Academy of Medicine in Paris, Dr. Guglielminetti[1] made the interesting suggestion that complicated apparatus may not, after all, be necessary for escape from a submarine which has rapidly sunk as the result of collision. He admits that our knowledge of the physiology of life at great depths is still very inadequate, but takes as his text the pearl-diver of the Indies. He points out that there is no danger from emboli at depths of less than 13 metres, and that below this depth their formation depends on the length of time that the man has remained under pressure. He also lays stress on the fact that the nitrogen of the air embolus is derived from the air breathed in, and expresses the opinion that a period of five minutes is not sufficient to charge the blood with enough nitrogen for the formation of emboli. If, therefore, the sailor can reach the surface within five minutes of being subjected to increased atmospheric pressure he will not run the risks of decompression. Pearl-divers descend quite as far as many submarines, stay there just long enough to snatch oysters from the rocks, and return rapidly to the surface. They arrive exhausted and suffocated, but they never show the phenomena of decompression. The human body can stand extraordinary pressures, because it is composed of 90 per cent. of water, and if the dangers of decompression could be averted the occupants of the submarine could rise to the surface without apparatus, just like the pearl-diver. Survivors of submarines destroyed during the war declare that they shot to the surface with great rapidity, and Dr. Guglielminetti calls for laboratory experiment to find whether it is not really possible for men caught in disabled submarines to take a deep breath and then let themselves rise to the surface without any further complications.

[1] Bull. de l'Acad. de Méd., 1931, cvi., 21.

IRON IN THE BLOOD OF INFANTS.

Dr. Helen Mackay's report[1] on the nutritional anæmia of infancy is to a certain extent supplemented by a careful study of the iron content of the blood of infants by Dr. I. A. Kotikoff[2] of Leningrad. His observations were made on a group of 20 normal breast-fed babies, beginning at the end of the second week in life and continuing first at fortnightly and later at monthly intervals. The blood was obtained from a small incision in the heel and the iron was estimated by the Foweather method, a total of 119 estimations being carried out altogether. The adult standard of 50 to 60 mg. per 100 c.cm. was accepted for purposes of comparison and on this basis the iron content of the infants' blood quickly fell from a high level in the first few weeks to a subnormal level which persisted for the rest of the first year. The average in the first month for 14 infants was 61·8 mg. per 100 c.cm. and the lowest figure recorded was in the ninth month when it dropped as low as 38·7 mg. According to Kotikoff, it may be taken that after the preliminary period of about six weeks, during which the organism is adjusting itself to new conditions, the iron content of the blood lies between 40 and 45 mg. This figure for iron shows a close connexion with the figure for hæmoglobin and it is demonstrated that the amount of hæmoglobin expressed in milligrammes per 100 c.cm. is 1·87 times the amount of iron. Kotikoff has tried to discover why healthy breast-fed infants should all have a comparatively low blood iron. He admits that breast milk does not contain an adequate amount of this substance, but all these children, from the sixth month, and sometimes earlier, received a mixed diet with fruit juice, vegetable soups, and the like. He finds that the beginning of this mixed diet causes a temporary slowing of the gradual fall of blood iron and he thinks that further work will be able to show the importance of dietetic factors. The iron content was apparently not increased by ultra-violet irradiation or by cod-liver oil. A definite rise was noticeable towards the

[1] See THE LANCET, July 25th, p. 195.
[2] Jahrb. f. Kinderh., 1931, cxxxii., 180.

end of spring and Kotikoff thought this could be correlated with certain weather conditions. Carrying his biochemical investigations a step further he estimated the calcium and potassium content of the blood in some of these infants and found a definite relationship between these and the amount of iron present. He says that in the first year of life the iron divided by the calcium gives a factor of 3·89 and if this figure falls below 3·5 it indicates a definite pathological state. By studying the amount of iron in the blood month by month in individual cases he shows that the amount present is a good criterion of the infant's health and in a few cases in his series sudden changes were observed in association with passing illnesses. He argues from his results that from the very early days of infancy it is necessary to supply iron to the organism and he pleads for more research to discover the best way of giving it. The work of Dr. Mackay supplies an answer.

DEVELOPMENTS AT HANWELL.

THE centenary of the Hanwell Mental Hospital was celebrated on July 29th by the opening of an admission hospital. As Dr. Adeline Roberts and other speakers pointed out, this hospital has, in the course of its history, been a pioneer in more than one direction. The name of Colonel Clitherow, the first chairman of the first visiting committee, is closely associated with the formation of the Queen Adelaide Fund, the first of after-care associations. The first superintendent was Dr. (afterwards Sir) William Ellis, a pioneer of "occupational therapy." He set the patients to trades and established a "bazaar," where the goods they made were sold, the proceeds being used for their benefit. As early as 1832 a consulting physician and a consulting surgeon were appointed. In 1839 the famous Dr. John Conolly became superintendent. He it was who abolished barbarous mechanical restraint, following the example of Pinel and Tuke. The hospital, originally built for 300 patients, now has 2400 beds, and during the war it actually accommodated 2750 patients at one time. Mr. L. G. Brock, the chairman of the Board of Control, in declaring the new admission hospital open, hailed the occasion as one of quite exceptional interest, because it combined a centenary—the triumph of antiquity—with the opening of an admission hospital, the triumph of modernity. He emphasised the fact that early treatment consisted both of earliness and of treatment, and deprecated the lip service paid by some people to the idea of early treatment by the provision simply of a place where the new admissions could be kept apart from the other patients. The real admission unit, the strategic centre of the whole organism, was a place where everything possible was done to alleviate the patient's condition and where he might find attractive and suitable environment. It was absolutely essential, he said, that the provision for early cases should be of a kind that would encourage them to apply for treatment, and that the treatment should be such that they would have faith that everything possible was being done for them. It was no use calling an institution a hospital unless it was permeated with the hospital spirit. He expressed his conviction that effort in this direction would be reflected in the recovery-rate, and cited the malarial treatment of general paralysis as sufficient answer to any pessimist.

The new villa is a detached, self-contained unit, to be staffed mainly by women nurses. It will provide accommodation for 50 men and 50 women, and is built mainly on one floor on three sides of a quadrangular courtyard. Each block has an examination room, a a sick dormitory, a verandah, private rooms, and a solarium, and in the central block are kitchens and an associatic 1 room common to both sexes. Special rooms for X rays, ultra-violet rays, and Plombières treatment are provided. The estimated cost of the villa, including its equipment and grounds, is over £53,000, and this building is the first item in a long programme of modernisation which the London County Council has decided to undertake in the oldest public mental hospital of the country.

HOUSING AND MALARIA.

A VALUABLE summary [1] prepared by Lieut.-Colonel Clayton Lane shows once more the importance of housing as a factor in the problem of malaria. It is well known that in areas where malaria is endemic certain houses acquire the reputation of being "malarious," from the fact that their inhabitants are frequently attacked by the disease, and the available evidence indicates that, in Europe at least, these houses have several characteristics in common. They possess rooms or landings which are dark, dirty, and often damp, qualities which appear to be attractive to malarial mosquitoes. The anopheles associated by experience with malaria are chiefly night-biting mosquitoes which attack their sleeping victims in their houses. The primitive house-dweller, it seems, often provides his own protection by building his house without a chimney, smoke being as offensive to mosquitoes as darkness is attractive; indeed, there appears to be reason to suppose that the invention of the chimney favoured the increase of malaria until a taste for larger windows came to balance it.

The suggestion that mosquitoes have an instinct to return to a pleasant hospice is only supported by questionable evidence, Colonel Clayton Lane says. Various experiments have been made, both in America and Kenya, by which anopheles were captured, sprayed with dye, and released at a distance from the site of capture, but these have not been carried out on a sufficiently large scale to be conclusive; the results indicate, at any rate, a tropism towards food. Nor is a stay-at-hospice habit invariable among anopheles; some species appear to leave the house immediately after feeding, while others remain in a sluggish state for some hours after feeding, and J. A. Le Prince in America found that children could be readily trained to kill every anopheles in the room. The importance of the destruction of replete anopheles as an antimalarial measure was demonstrated in the early days of the construction of the Panama Canal. The female anopheles is impelled to leave the house after feeding by the necessity for oviposition; during hibernation the insect does not feed and there is no oviposition, so that there is no danger of transmission of malaria. N. H. Swellengrebel has shown, however, that for *A. maculipennis* in Holland there is an intermediate condition, which he calls gonotropic dissociation, in which oviposition is in abeyance but feeding continues. When in this condition mosquitoes remain in the house where they have fed, and are capable of becoming malarious and transmitting the disease. Moreover, there is some evidence that anopheles sick

[1] Housing and Malaria. A Critical Summary of the Literature dealing with this subject. By Lieut.-Colonel Clayton Lane, M.D., I.M.S., retd. League of Nations publications, 1931, iii., 6. Obtainable in Great Britain from George Allen and Unwin, 38, Great Ormond-street, London, W.C. Pp. 43. 1s. 6d.

of malaria become too sluggish and ill to leave the house for long at a time, and S. P. James describes them as finding a sheltered hole a few feet from the bed, from which they make a nightly sally to feed. The view put forward by E. Roubaud in 1919 that human beings are protected from malaria by the presence of animals in sheds or stables near the house has been considerably modified since then. He later declared that to be effective the animals must be housed in low, dark quarters free from draughts. Under conditions in which the human habitations share these same disabilities, however, Colonel Clayton Lane finds no satisfactory grounds for thinking that malaria-carrying anopheles prefer the blood of the animals to that of the men; he suggests by inference that to house man well is likely to prove a better antimalarial measure than to house animals badly. The value of screening of houses was established as long ago as 1900 when Sir Patrick Manson carried out his experiment in the Roman campagna. The only protection employed by the experimenters was the adequate screening of their quarters, and not one of them acquired malaria, although they went about the country freely during the day.

Colonel Clayton Lane's summary serves to collate the evidence that malarial infection is acquired essentially in the house. In his opinion the chief protective measures lie in suitable disposition of buildings relative to anopheline breeding places, in their proper construction, and where necessary in the use of screening.

SOME RECENT POLICIES REGARDING PARTICULAR DISEASES.

UNDER this title Sir George Buchanan delivered before the Section of Public Health of the British Medical Association a presidential address which deserved the marked attention of the audience, and which, we hope, will be available shortly, in the full text, through the columns of the *British Medical Journal*. The general message of the address was that in dealing with public health policies in regard to particular diseases we should rely for our procedure to an increasing extent upon local experiment, the panacea in preventive disease being found wanting in proportion as knowledge and experience grow. Few, indeed, are the diseases which the epidemiologist can hope to curtail in spread, or to bar from a given locality, by one general set of methods. Psittacosis forms a solitary example of a particular infection, where complete exclusion from our own country, even in modern circumstances of inter-travel, was attended with success; and psittacosis may be a comparatively trivial disease, but Sir George reminded us that it was none the less responsible for over 100 cases within a few months recently, with 25 deaths.

The occurrence of communicable diseases, and the complexity of their manifestation, leaves psittacosis in a class by itself; indeed, it is rare that even the main lines of policy, directed against a particular disease, can be so generally applicable as to result in homogeneous international action. Referring to the methods now being tried in many countries to combat malaria, Sir George reminded his hearers that public health authorities in various parts of the world at one time offered, as their single policy against the spread of malaria, activities based on the intensive local attack of the breeding-places of anophelines. We know how successful this policy has been in certain mosquito-ridden areas, but in others the circumstances of the area have produced different procedures of prevention as practical knowledge of malaria increased. The limitations of quinine, for example, which had been suspected by many, especially those whose war service brought them into malarial districts, are now recognised, and drugs have been utilised which meet some of these limitations; and, again, the work which has centred round the Horton Laboratory, where all phases of malaria are studied in association with the manifestations of general paralysis, has introduced a new phase of study. In further development of arguments against a general trust in any therapeutic or preventive procedure, because it has proved, and is proving, beneficial at certain times or in certain places, the lecturer commented on the variations of public health policy now adopted in dealing with yellow fever and leprosy, but he chose as his principal example of a definite change in scientific thought the views held now upon isolation, immunisation, and the influence of carriers, when considered in connexion with scarlet fever and diphtheria. The hospital isolation of scarlet fever he described as representing a social convenience—"any local area which has once possessed it would not willingly dispense with it"—but he found no evidence withstanding examination that the spread of scarlet fever has been checked by isolation, or that either the severity or mortality has been diminished. Practical experience may thus be confirming the conceptions of scarlet fever entertained by the immunologists. Both in scarlet fever and in diphtheria we have, the lecturer considered, justification of the isolation hospital as a place of treatment and of observation—"theaccent is shifted from *isolation* to *hospital*." This view of isolation hospitals has led to study within their walls of a variety of different diseases, and the close association of these institutions with bacteriological and clinical research is full of promise, and is displaying performance. While the routine in connexion with the detection of carriers has been much dispensed with, bacteriological study has been largely directed towards the production of artificial immunity. For diphtheria, systematic immunisation is now an accepted policy among the staffs of hospitals for infectious diseases and in certain schools and institutions, and much work has been done in the same direction for scarlet fever, though an immunising agent requires here to do more than prevent uncomplicated manifestations of the disease, a difficulty which has also occurred with small-pox where vaccination is a standard form of successful immunisation.

Small-pox constitutes a good example of possible value coming out of intensive local investigations, because of the remarkable variations in severity which attend different local outbreaks. Sir George Buchanan pleads for the establishment of local centres of research, not only here, but in connexion with the prevention generally of the greater scourges. He suggests that in this manner some of the problems of acute rheumatism in children and of the increasing cancer death-rate might be helped towards elucidation. He advocated the setting on foot of local effort inspired by local enthusiasm, and closed his address with these words: "It seems, indeed, even from the random examples I have given, that in dealing with public health policies in regard to particular diseases we can hardly have enough local experiment." The sentence is significant, coming from one of the chief officers of our national health department—a department too often accused of aiming at bureaucratic centralisation.

THE DIFFERENTIAL DIAGNOSIS OF ANGINA PECTORIS.

IT is not so long since the clinical picture of coronary artery disease, with its many variations, has been rescued from the profusion of symptoms labelled indigestion and made into a clinical entity. To those who have worked hard to differentiate the syndrome, it is depressing to observe signs that in diagnosis its cardinal features remain unrecognised in many quarters. In an article entitled Referred Pain of Gastro-intestinal Origin Simulating Angina Pectoris,[1] Dr. Robert Palmer does not convince us that confusion in diagnosis need still occur, certainly not that the reaction of such patients to "continued gastric régime" must be studied before a diagnosis can be arrived at. It is certainly true that reflex gastric symptoms are common in cardiac pain, but the features of the pain are usually clear cut. Dr. Palmer does not take into account the possible occurrence of intermittent claudication of the mesenteric vessels, when the mesenteric arteries are affected by arterios-clerosis; this possibility, with its resulting digestive symptoms, should be borne in mind with all patients showing marked atheroma of other vessels. The cases supplied to illustrate difficulty of diagnosis are few and incomplete. We are not told the blood pressure in any one case; this is an important omission, since patients suffering from high blood pressure may complain of cardiac pain for some years. No mention is made of the Wassermann reaction in any case. It is acknowledged that it is possible to mistake pain of gastro-intestinal origin for angina pectoris, but the mistake should be rare, in the light of recent knowledge, among those familiar with the manifestations of coronary artery disease.

CEREBRO-SPINAL FEVER.

SOME of the problems which arise in the prevention and treatment of cerebro-spinal fever were considered in our issue of Feb. 21st. Readers who require further light on these difficulties will find it in a report[2] just published by the Ministry of Health, which deals with the transmission of the disease by carriers, the value of serum, the use of vaccines, and the measures to be taken with contacts. The treatment recommended, apart from good nursing, includes early and repeated lumbar puncture, to relieve pressure and to promote drainage of the cerebro-spinal system; in addition the use of antimeningococcal serum is advocated, to be administered, if possible, with the first lumbar puncture. The administration should be repeated at 24-hourly intervals until recovery appears to be well established and the cerebro-spinal fluid has become clear. It should not be discontinued if the first examination of the C.S.F. yields no meningococci; nor should lumbar puncture be delayed if serum is not immediately available. The amount of C.S.F. escaping after lumbar puncture in adults is commonly in the region of 50 to 70 c.cm., and the amount of serum injected should on no account exceed the amount of fluid withdrawn; 30 c.cm. of serum is given as the usual intrathecal dose for an adult, and it is best injected with the patient anæsthetised, since the pain may be considerable. With infants, who do not tolerate the injection of serum well, the use of an anæsthetic is considered inadvisable. Satisfactory results appear to have been obtained in Rumania by giving a daily intrathecal dose of polyvalent antimeningococcal serum combined with an intramuscular dose of about 60 c.cm. of the same serum for at least three or four days. In spite of the promising results of serum therapy in the early stages, it has undoubtedly proved useless in many cases, partly because of the difficulty of assessing the probable therapeutic efficiency of antimeningococcal serums by laboratory methods, and partly because of the multiplicity of strains of meningococci responsible for sporadic cases, and apart from the local strains recognisable during an epidemic. At the present time it is thought that reliance must be placed on polyvalent serums. Vaccines, it is stated, may be useful during slow convalescence, and should consist, if possible, of killed cultures of the patient's own meningococcus, given subcutaneously in fairly large doses, beginning with 250 millions. No satisfactory data exist as regards the use of vaccines in prophylaxis. The swabbing of contacts is advocated with a view to the detection of carriers. To be effective, swabs should be taken from the upper end of the posterior pharyngeal wall, and contamination with saliva should be avoided. Fresh air and exercise, without other treatment, have been found to be the best means of freeing a carrier of the meningococcus; the use of a fine vapour spray of zinc sulphate, 1½ to 2 per cent., directed through the nostrils and mouth to the nasopharynx, appears to have been beneficial in some cases.

[1] New England Jour. of Med., 1931, cciv., 1351.

[2] A Review of Certain Aspects of the Control of Cerebro-spinal Fever in relation particularly to a scheme for collecting the results of serum treatment. Ministry of Health Reports on Public Health and Medical Subjects. No. 65. H.M. Stationery Office, 1931. Pp. 23. 6d.

AN ADVISORY COMMITTEE TO THE BOARD OF CONTROL.

THE Board of Control, with the approval of the Minister of Health, have appointed a committee to advise them on questions arising in connexion with scientific and ancillary mental health services. The members are: Mr. L. G. Brock, chairman of the Board of Control (chairman); Sir Hubert Bond, F.R.C.P.; Mr. Robert Bruford, J.P.; Mr. W. E. Lovsey, J.P.; Dr. T. S. Good; Dr. Adeline Roberts, J.P.; Mr. J. C. Grime, J.P.; and Prof. J. Shaw Bolton, F.R.C.P., with Mr. P. Barter as secretary. The Mental Treatment Act, which came into operation on Jan. 1st, confers upon local authorities powers to provide for out-patient treatment and for the after-care of mental patients, and, subject to the approval of the Board of Control, to undertake or to contribute to research in regard to mental illness. The Board have appointed the advisory committee to assist them in the consideration of schemes of research submitted for their approval, and in regard to such questions as the organisation of social services in connexion with out-patient treatment and after-care, on which local authorities may seek the Board's guidance. On technical questions relating to research the advisory committee will have the expert advice of members of the Medical Research Council's committee on mental disorders.

LONDON HOSPITAL SATURDAY FUND.—At a meeting of the council last week it was reported that the fund during the past year had decreased by £5000. The fall was explained to be due to competition from similar organisations and to the general financial stringency.

EXTENSION OF WORKSOP VICTORIA HOSPITAL.—A new wing of this institution was recently opened by Viscount Galway, to whose grandmother, Henrietta, Lady Galway, it owed its inception in 1867, and dedicated by the Bishop of Southwell.

SPECIAL ARTICLES

THE CEREBRAL CORTEX IN MAN.

PROF. FOERSTER'S LECTURES.

UNDER the auspices of the University of London an important series of lectures on the cerebral cortex was delivered recently by Prof. Otfrid Foerster of Breslau. Prof. Foerster is one of the foremost neurologists of the day and his work has always been distinguished by the contributions that he has been able to make from his study of patients to the anatomy and physiology of the nervous system. Although trained as a neurologist he has for many years done his own surgery, and during operations on the brain he has systematically developed the work of electrical stimulation of the human cortex begun by Horsley, Fedor Krause, Cushing, and others. It is safe to say that he is now without equal in his knowledge of this subject.

Prof. Foerster began by referring to the work of Oscar and Cécile Vogt. The Vogts have shown that differing motor effects obtained by stimulation of various parts of the cerebral cortex of animals correspond to differences in the arrangement, number, and morphological characters of the nerve-cells and medullated nerve-fibres in the various parts of the cortex. They have thus been able to divide the cortex into a number of sharply defined areas each giving a specific motor effect on stimulation and possessing its own specific architectonic structure. Prof. Foerster's results in man agree closely with those obtained by the Vogts and he employs the system of terminology that they introduced (see Figure).

The lecturer then proceeded to discuss various areas of the cortex in man. For each area he described the architectonic structure, the effects of electrical stimulation, the effects of irritation by pathological lesions, and the effects of partial or complete destructive lesions. In the surgical treatment of epilepsy he has frequently had occasion to stimulate and excise portions of the cortex. He has also observed with minute care the effects produced by tumours and other lesions of the cortex and in the course of these lectures he cited over 100 cases.

Precentral Gyrus.

Area 4.—The precentral gyrus in man is composed of two distinct areas: the area 4, which lies in and immediately in front of the Rolandic fissure, and a more anteriorly placed area called by the Vogts 6 a α (see Figure). The area 4 gives origin to the fibres of the pyramidal tract. Stimulation of a point in this area by threshold galvanic stimuli, with the patient under local anæsthesia, or by faradic stimuli with the patient under general anæsthesia, produces an isolated movement of a single segment of the extremities or a single part of the trunk or head. In most instances the effect is on the opposite side, but stimulation of the parts supplying the upper part of the face, the pharynx, vocal cords, and the muscles for closing the jaw gives bilateral reactions. Occasionally stimulation of the areas for the trunk and thigh also produces bilateral movement. Stimulation of the area supplying the neck gives a response chiefly of the sternomastoid of the same side, the head thus being turned to the opposite side, and the external pterygoid muscle also has ipsilateral representation. The arrangement of the parts of the area 4 corresponding to the various movements is well known. In man there exist separate foci for each of the fingers and these occupy a relatively large part of the area. The focus of the fifth finger is the most superior, that of the thumb the most inferior. To obtain circumscribed effects by electrical stimulation in man it is necessary to use threshold stimuli and the surface of the convolution must be dry. Under such circumstances the effect of galvanic stimulation may be limited to a single muscle or even to part of a single muscle. It is thus clear that the precentral gyrus contains separate innervation not only for single muscle groups but also for single muscles. The threshold of these foci varies from one individual to another, the average being 1–2 ma. (milliampères).

Area 6 a α.—In monkeys the entire surface of the precentral convolution is occupied by the area 4 and the area 6 a α lies in the frontal convolutions. In man the area 4 lies chiefly in the Rolandic fissure and the area 6 a α occupies the greater part of the summit of the precentral convolution. In man stimulation of points of the area 6 a α produces the same isolated motor effects that are obtained by stimulation of the area 4, and there is the same detailed subdivision into foci for single segments of the limbs, but the threshold is much higher. These isolated effects from stimulation of the area 6 a α are due to transmission of the stimulus to the area 4, for they are abolished by an incision into the cortex between the two areas, or by abrasion of the superficial layers of the cortex in the area 6 a α. Under these circumstances, or if the pyramidal tract has been previously destroyed by disease, strong faradic stimulation of the area 6 a α produces rotation of the head, eyes, and trunk to the opposite side (adversive movements), and the contralateral limbs carry out complex synergic movements of a flexor or extensor character. These movements are brought about by direct (extra-pyramidal) innervation from the area 6 a α to the subcortical and other lower centres.

Cases of Jacksonian epilepsy and of epilepsy produced by lesions in the precentral gyrus when the pyramidal tract had previously been destroyed were cited to confirm the results of stimulation. The lecturer then described a remarkable series of cases of destructive lesions of the precentral gyrus to show the essentially focal nature of the resulting paralysis when a limited part of the precentral gyrus was destroyed. Thus, from a gunshot wound affecting the medial part of each "motor" area in the paracentral lobules, a patient had bilateral spastic paralysis of both feet. The movements of the legs and thighs were not affected. This patient also had retention of urine. Prof. Foerster believes that the foci of the bladder and rectum lie in the paracentral lobule. Another case, of syphilis affecting one precentral gyrus, had spastic paralysis limited to one foot which superficially resembled a case of peroneal palsy. A case of meningioma of the falx cerebri observed through a number of years showed spastic paralysis of both legs and retention of urine. Gradually the paralysis extended to involve the muscles on the right side of the abdominal wall and diaphragm, the right shoulder and arm, and finally the forearm. The hand and fingers were never impaired. This patient never had headache or papillœdema. The case demonstrates clearly by the succession in which the different parts became

paralysed the somatotopic focal subdivision of the precentral convolution. Another case of cortical lesion showed paralysis limited to supination of the forearm and extension of the wrist and fingers of one side. Cases in which the thumb or one or two fingers alone were paralysed were not rare, and isolated cortical paralysis of the interossei of one hand had also been observed. Excision of limited parts of the precentral convolution was followed by similar circumscribed focal palsies, but these were often more or less transient, especially in children. Recovery in such cases must be attributed to the more or less diffuse arrangement in the cortex of the motor foci of single muscle groups.

Frontal Convolutions.

Area 6 a β.—The area 6 a β (the frontal adversive field) occupies the posterior part of the superior frontal convolution. In man it does not react to galvanic stimulation even under local anæsthesia. Faradic stimuli of high intensity must be used. The effect produced is similar to that obtained by stimulation of the area 6 a α when the pyramidal tract has been destroyed—rotation of the head, eyes, and trunk to the opposite side and complex synergic movements of flexion or extension of the contralateral arm and leg. This response is still obtained after the areas 4 and 6 a α have been destroyed. Thus the area 6 a β has its own motor pathway to the subcortical centres. The movements obtained by faradic stimulation of the area are easily converted into an epileptic attack, and attacks of exactly the same type are produced by many different pathological processes involving the area 6 a β. Most of the cases cited had been completely relieved of their fits by excision of the area and this procedure was not followed by any recognisable defect of motility.

Area 8 α β δ.—This area (the frontal eye field) occupies the posterior part of the second frontal convolution. In many cases it reacts to galvanic stimulation (threshold, 4·0 to 8·0 ma.), but in other cases faradic current is necessary to obtain an effect. The response is an isolated movement of the eyes to the opposite side, and occasionally also in an upward direction. Strong faradic stimulation produces a convulsion, which may be limited to the eye muscles, but in most cases other movements occur, indicating a spread of the stimulus to the area 6 a β or to the areas 6 a α and 4. These attacks may be confused with attacks originating from the area 6 a β unless it is recognised that the fits begin with clonic movements of the eyes to the opposite side and only later involve the muscles of the head, trunk, and limbs. Pathological lesions of this area produce fits similar to those observed experimentally. Excision of the area is in some cases followed by more or less complete paralysis of lateral movement of the eyes to the opposite side, but this is temporary.

Area 6 β.—This small area occupies the most inferior part of the precentral convolution. Electrical stimulation of it produces rhythmic coördinated movements of the lips, tongue, mandible, pharynx, and larynx. The area appears to be unique, inasmuch as stimulation of it by a continuous galvanic current produces rhythmic movements, and the effect outlasts the stimulus. No other area of the cortex behaves in this way. Epileptic convulsions originating from the area 6 β begin with the same type of movements—chewing, licking, swallowing, and grunting movements—but in most cases the attack spreads to the adjacent areas 4, 6 a α and to the postcentral convolution.

The Postcentral Convolution.

Area 3, 1, 2.—The area 3, 1, 2 occupies the postcentral convolution and extends to the median surface of the brain, where it occupies the posterior part of the paracentral lobule. Faradic stimulation of the area is followed by paræsthesias, seldom by pain, in different parts of the body. The area shows a detailed somatotopic subdivision into a large number of sensory foci, each of which represents a special segment of the limbs or a special part of the body. The arrangement is in the same order as in the precentral convolution. Motor effects also follow stimulation of the postcentral convolution. They are obtained best by galvanic stimulation and are of the same isolated character as the effects obtained by stimulation of the precentral convolution, but the threshold is 2–4 ma. higher. They depend on the integrity of the area 4 and of the pyramidal tract. If either of these is destroyed no isolated motor effect can be obtained from the area 3, 1, 2, but strong faradic stimulation may still produce complex movements identical with those obtained by stimulation of the area 6 a β. Fits produced by lesions in the postcentral convolution begin with focal paræsthesias which spread. Motor discharges may then occur, usually at a distinct interval after the wave of paræsthesia.

A number of cases illustrating sensory disturbances by lesions of the postcentral gyrus were cited to show that focal lesions affect the sensibility of limited areas of the limbs and trunk. Thus, in one case of traumatic injury showing sensory Jacksonian attacks beginning with paræsthesias in the ring and little fingers, the disturbance of sensibility was limited to these two fingers. In many such cases of circumscribed lesions the anæsthesia of the extremities is limited by a circular line, but in others the areas of anæsthesia occur in the form of bands and strips along the extremities (anæsthesia of the axial type). It is possible that each sensory focus in the postcentral convolution is subdivided into anterior and posterior parts, the former corresponding to the lateral, the latter to the medial half of the segments of the extremities.

Loss of sensibility following destructive lesions of the postcentral convolution is recovered from to a considerable degree, and this is partly due to the fact that some afferent pathways do not cross, but end in the cerebral hemisphere of the same side. The intact hemisphere may substitute for the impaired hemisphere to a certain extent. But even in bilateral postcentral lesions a certain degree of recovery may be observed. This is explained by the fact that sensory areas in the cortex are not limited to the postcentral convolution. The superior parietal lobe is certainly part of the sensory cortex in man. The work of Dusser de Barenne in monkeys suggests that the sensory cortex has a wider distribution than hitherto supposed, but so far Prof. Foerster has no evidence that areas other than those described above contribute to the sensory cortex in man.

Destruction of the postcentral convolution is followed by disturbance of mobility as well as by defects of sensibility because coördination of movements depends on the integrity of the afferent pathways. Various types of ataxia occur.

Parietal Lobe.

Area 5 a.—This relatively small area lies in the upper part of the superior parietal lobe, immediately behind the postcentral convolution, and extends to

the median surface of the hemisphere. In man it reacts in most cases only to faradic current, but in a few cases galvanic stimuli of high intensity (6–10 ma.) are also effective. Motor and sensory effects are observed. The motor response consists of complex movements of the opposite arm and leg similar to those obtained from the area 6 a β; but in addition the arm and rarely the leg of the same side also take part in the movements. Furthermore, if stimulation is limited to the area 5 a and does not radiate to the area 5 b the head and eyes are not turned to the opposite side. The sensory effect consists of widespread paræsthesias and sometimes pain appearing simultaneously in the trunk and limbs of the opposite side, and sometimes also in the bladder and rectum. Epileptic attacks originating from lesions of this area are often preceded by a sensory aura which differs from that occurring in lesions of the postcentral gyrus, in that it involves the various parts of the opposite half of the body simultaneously rather than successively. The motor manifestations of these fits are similar to those obtained by stimulation of the area. Excision of the area 5 a is followed by defects of sensibility.

Area 5 b.—This is a large area in man, and occupies the greater part of the superior parietal lobule and precuneus. It reacts to strong faradic currents only. The primary motor effect is deviation of the head and eyes to the opposite side but if the anterior part of the area is stimulated movements of the contralateral limbs occur, due to spread of the stimulus to the area 5 a. Sometimes sensory effects are also produced, and they resemble those obtained by stimulation of the area 5 a. In one case removal of a cyst from this area produced in the patient a feeling that she was turning to the opposite side and falling from the operating table. In another patient attacks of the 5 b–5 a type were preceded by vertigo and faradic stimulation of the interparietal fissure at operation produced a similar feeling. From these and other cases Prof. Foerster thinks that the interparietal area may be the cortical area in which the vestibular pathways end.

Areas 7 b and 7 a.—These areas comprise the inferior parietal lobe. Prof. Foerster has never observed any sensory effect from stimulating these areas, not even with the strongest faradic current. No disturbance of sensibility has been observed after excision of these areas. With very strong faradic currents rotation of the head and eyes to the opposite side was observed, in a few cases only, when the posterior parts of the area 7 b were stimulated.

Temporal Lobe.

Area 22.—The area 22 occupies the posterior part of the superior temporal convolution and its borders have not yet been fully defined. Stimulation produces adversive movements similar to those obtained from the area 6 a β. Sensory effects may also be obtained in the form of noises and sometimes voices of obscure character. Epileptic fits originating from the area 22 may show an acoustic aura, and in a few cases the fit was produced by a sudden sharp noise. Thus in one boy suffering from the effects of an old birth injury of the area 22 an attack could be provoked with experimental promptness by letting an object fall on the floor, or by the noise of a passing tramcar.

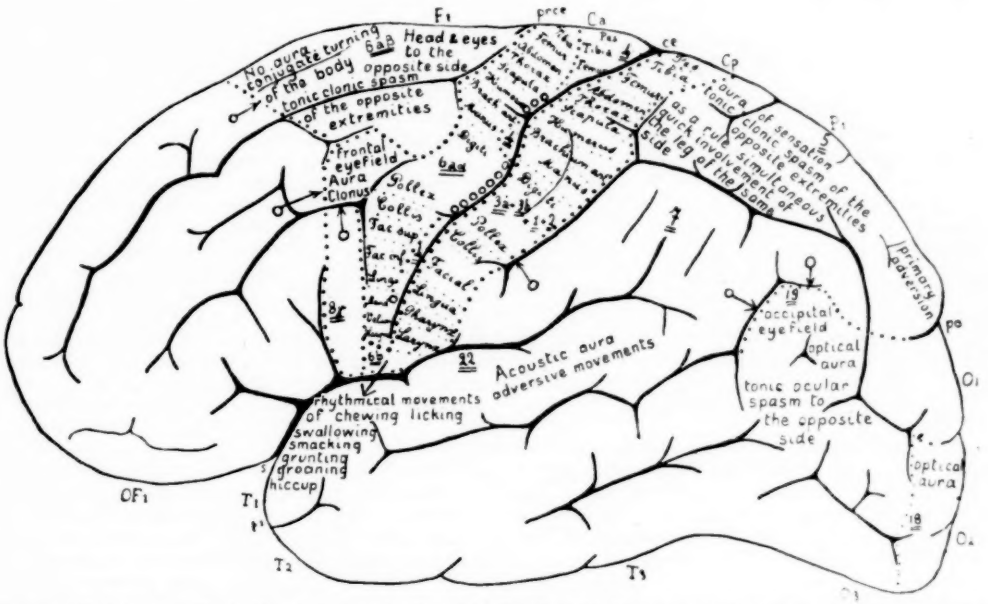


Diagram modified from an illustration in a paper by C. and O. Vogt in "Die Naturwissenschaften" (1926, xiv., 1191, published by Julius Springer, Berlin). A similar diagram was used by Prof. Foerster in his lectures.

Specific Functions of the Motor Area.

Summarising the effects obtained from the different motor areas it is seen that they may be divided into pyramidal and extrapyramidal areas. Isolated effects can be obtained from stimulation of the areas 6 a α, 4, and 3, 1, 2; they depend on the integrity of the area 4 and its motor pathway the pyramidal tract. Thus the area 4, the area pyramidalis, is the specific area for isolated innervations. All the other areas, 6 a β, 5 a, 5 b, 22, and, when the area 4 or the pyramidal tract is destroyed, the areas 6 a α and 3, 1, 2, react with complex movements of rotation of the eyes, head, and trunk to the opposite side, and

of flexion or extension of the contralateral limbs. These are the extrapyramidal areas. Both groups coöperate when voluntary movements are performed. If the area 4 or the pyramidal tract is destroyed isolated movements can no longer be performed but voluntary movement is by no means completely abolished. Complex flexor or extensor movements of the affected limbs can still be performed, but the movements are combined; this is even more evident when both pyramidal tracts are destroyed. Thus, in spastic tetraplegia all four extremities move together, whichever one of them is moved voluntarily. This reveals the specific function of the extrapyramidal areas. The pyramidal tract takes an uninterrupted course from the cortex to the anterior horn cells of the spinal cord. It is a fast-train connexion between the cortex and the cord. All the other motor pathways, originating in the extrapyramidal cortical areas are interrupted by relay stations in a number of subcortical centres before they reach the anterior horn cells. They are slow-train connexions between the cortex and the cord.

Occipital Lobe.

Area 17.—This is the area striata. In monkeys Sherrington obtained movement of the eyes to the opposite side, but in man stimulation produces no motor effects. The area reacts with optic sensations. When the occipital pole or the posterior part of the area striata on the medial surface is stimulated, the patient sees a stationary light or stars immediately in front of him. When the anterior part of the area is stimulated the light is seen in the peripheral parts of the visual field and is moving towards the centre of the field. If the superior lip of the calcarine fissure is stimulated the light comes from below; when the inferior lip is stimulated it comes from above.

Area 18.—This, the area occipitalis, lies on the lateral surface of the occipital lobe immediately in front of the area 17 and it extends to the medial surface of the hemisphere where it lies both above and below the area 17. Faradic stimulation of this area also produces optic sensations.

Area 19.—The preoccipital area occupies the rest of the occipital cortex and it lies chiefly on the convex surface of the hemisphere. Faradic stimulation produces sensory and motor effects. The sensory effects are optic phenomena of a rather complex character: the patient not only sees a light, stars, or colours, but also figures, people, animals, and so forth. The motor effect consists of movements of the eyes to the opposite side. These results conform with clinical and operative observations of patients suffering from lesions of this area. A number of interesting observations were described, and Prof. Foerster concluded by citing evidence in favour of bilateral representation of the macula.

HARROW MOTHERS' HOSTEL.—In the year 1930–31 there were 122 admissions and as many deliveries. The total weekly cost per patient was £5 14*s.*, and the average weekly payment by patients was £2 19*s.*

SUSSEX PROVIDENT SCHEME.—This organisation for hospital and specialised medical services continues to increase its scope. During the first six months of the current year £8468 was paid to the coöperating institutions, of which the Royal Sussex County Hospital received £3200, and the Royal Alexandra Hospital for Sick Children £1057. The sum of £323 was paid to the Brighton Corporation; and £325 was refunded to subscribers for treatment at non-coöperating hospitals, &c. In the ten years the scheme has been in operation no less than £81,493 has been distributed to hospitals and kindred institutions.

CASUALTIES AND STATISTICS OF THE WAR.

THE OFFICIAL HISTORY.

THE last volume of the "Official History of the War" [1] is unique in that Great Britain is the only country that has published statistics dealing with total casualties from front lines to base. The volume records over 11,000,000 casualties sustained by the British forces at home and overseas. Despite the unavoidable omissions, the wastage which it represents proclaims the cost of modern warfare. The hardship and sacrifice behind the figures can find no place in the analysis, but have nevertheless inspired it in the hope of furthering research to alleviate suffering and prevent disease. The work is largely due to the determination of the late Sir William Leishman that the lessons to be learned from this wealth of material should be made available for all time.

The first chapter relates the vicissitudes through which the book passed in preparation, and the difficulties of striking a balance between theoretical perfection and economy. By focusing attention on the difficulties of building up an organisation to compile statistics, it may help in the evolution of a simpler method for the future. The peace-time system soon proved quite inadequate as the forces increased and patients were rapidly transferred. In 1917 the War Office took over the cost of routine statistical work and instituted the official medical history cards, which were collected by the Medical Research Council to be used later as data for statistics. Unfortunately, even this scheme miscarried, and mistakes were made on all sides, so that in the end the only cards which were of any value were those from the British Expeditionary Force in France. By May, 1919, little progress had been made in obtaining statistics that would be helpful for general and Army medical purposes, although a great deal had been done in compiling and filing twenty odd million individual records. An additional staff was therefore appointed, and when the register of index cards was complete—in 1921—it was decided to examine two sample sets, each of about 500,000 cards, to form the basis of a statistical volume. Finally, it was decided that the book must be limited to the outstanding problems of casualties, man-power and wastage, and to tabulating and publishing the type of information which was regularly called for or constantly used during the war by staff, administrative, and medical officers.

The Magnitude of the Casualty Problem.

Casualties are classified and analysed according to their area, and non-battle casualties and the chief causes of inefficiency among the troops are discussed, while the concluding chapter records the work of the Ministry of Pensions since its inception. The after-effects of the war are strikingly illustrated by the fact that—exclusive of Dominion and other overseas forces—2,414,000 individuals, or 40 per cent. of those who served, were affected by war service in the sense of death or some disablement for which compensation was given.

"If," the authors conclude, "these figures are remembered when preparations are being made, then questions relating to the supply of additional personnel, equipment and transport for the medical services will have a greater interest

[1] Casualties and Medical Statistics of the Great War. By Major T. J. Mitchell and Miss G. M. Smith. H.M. Stationery Office. 1931. Pp. 382. £1 1*s.*

for all branches of the Army, and they will be considered not only as a means of succouring sick and wounded, but as important factors in preventing wastage, conserving the man-power of the nation during hostilities, and reducing expenditure after the war."

The authors feel that the magnitude of the problem is scarcely realised, rarely studied, and seldom fully appreciated. As Sir William Robertson remarked, "The longer peace continues, the more difficult it is to prepare for war," and the medical services, like other services, lack the experience in handling and providing for large masses of men. The expansion of the forces in the war was without parallel, and the organisation had to be very different from that of peace. In August, 1914, the Royal Army Medical Corps numbered 1279 officers and 3811 other ranks, while in August, 1918, it numbered 10,178 officers and 100,176 other ranks, exclusive of Territorial forces. Moreover, 637,746 hospital beds were equipped and maintained. Another essential basis of calculation is the probable number of sick, dead, invalids, evacuations, and men returned to duty. Knowledge of local conditions in foreign countries will prevent "misfits" in sending unsuitable troops or equipment to foreign areas. Moreover, Eastern races may be added to the Army as troops for multifarious auxiliary duties, and failure to study their races, customs, and diets may involve serious casualties. Our labour battalions in France in 1917 and 1918 were composed of 117,848 Indians, Egyptians, South Africans, Fijians, and Chinese, for whom special hospitals, special diet, and special treatment had to be arranged. The native followers of the East African Expeditionary Force numbered nearly three times as many as the troops, and it was found that much disease might have been avoided if men from low-lying districts had been sent to low-lying country, and those from the highlands to hilly areas.

BATTLE CASUALTIES.

Where the figures are complete, they show that, of the sick and wounded admitted to medical units, 3·04 per cent. died, 58·10 per cent. were returned to duty, and 37·41 per cent. were evacuated overseas. In all theatres the percentage of deaths from disease or injury was lower than in the South African War, despite the much greater destructiveness of modern armaments; 55 per cent. of the deaths from wounds and 32 per cent. of those from disease or injury occurred in casualty clearing-stations and other front-line medical units. About 82 per cent. of wounded and 93 per cent. of sick or injured were returned to some form of duty.

The authors stress the futility of supplying the Army with the finest doctors, nurses, and material available unless casualties can be systematically collected, rapidly evacuated, and suitably accommodated, and urge the vital importance of coöperation between the medical services, the army commander, and the forces in the field. Our armies were insufficiently supplied with stretcher-bearers at the beginning, but gradually learned that it was worth while to supply enough men, and fit men, for this work, and to arrange very carefully the programmes, allotments, and time-tables for transport.

The fact that 1,140,398 wounded were admitted to casualty clearing-stations in France during 1917 and 1918 gives some idea of the work done by these units. Of the total number, 30 per cent. required and received immediate operation. Since 55 per cent. of the total deaths from wounds occurred in casualty clearing-stations, it is obvious that high medical and surgical skill should be available in them.

The authors discuss transport, mentioning the useful ambulance transport steamer or barge for river work; during the war 3,443,507 sick and wounded were evacuated from the front to the base in France by ambulance train or improvised ambulance train. Of the total sick and wounded admitted to casualty clearing-stations, 75 per cent. of the sick, 90 per cent. of the wounded, and 81 per cent. of the total sick and wounded required evacuation to the base, and transport accommodation had to be provided for 58 per cent. sitting cases and 42 per cent. lying-down cases. The authors think that the provision of vacant beds in base hospitals should be not less than 33 per cent. of the equipped beds; during the war the percentage was generally below this figure. Obviously such a task must involve forethought, organisation, and—above all—liaison between staff and medical officer. At the beginning of the war the text-book methods of evacuation broke down, but fortunately in France the service was soon restored. The early and systematic collection and evacuation of all casualties is a primary principle of the conservation of man-power.

Useful and interesting tables in this chapter show the percentages of wounds caused by different weapons, the regional incidence of wounds, and the percentage of casualties suffered by the various arms of the service.

In 1917, 30 per cent. of the sick and 20 per cent. of the wounded were admitted to convalescent depôts at the base; these units are invaluable during epidemics, for slight casualties, and to give exhausted men a period of recreation and hardening.

"The outstanding lesson of the war in this respect," the chapter concludes, "centres round the advisability of sending 1 or 2 per cent. of the hospital accommodation and 0·5 per cent. of the convalescent depôt accommodation with the advance troops."

NON-BATTLE CASUALTIES.

It is a platitude to medical men that the losses occasioned by the enemy are equalled and often surpassed by the silent intangible enemy of disease. In the war of 1914–1918, the invisible enemy claimed two casualties for every one inflicted by weapons of war. Of the non-battle casualties, excluding those of East Africa during 1914 and 1915, 1·83 per cent. died, and the daily percentage of strength reporting sick varied between 0·05 in the United Kingdom and 0·72 in East Africa. An interesting table shows the principal causes of admission to hospital, with the ratio per 1000 of ration strength, compared with figures from the South African War. As the chapter points out, the best method of enlisting the interest and coöperation of all ranks towards further progress in eliminating disease is to show plainly the wastage that it causes. The tables in this chapter deal with ordinary infectious diseases, Eastern infections, tuberculosis, pneumonia, venereal diseases, malaria, dysentery, influenza, frost-bite, trench-foot, war nephritis, and jaundice.

The succeeding chapters discuss the casualties according to their area: the United Kingdom, France and Flanders, Italy, Macedonia, the Dardanelles, Egypt and Palestine, North Russia, East Africa and South-West Africa, with a final chapter on the South African War for comparison, and another which analyses the million odd British casualties admitted to medical units between 1916 and 1920.

The Work of the Ministry of Pensions.

The last chapter aims to give a broad presentation of the Ministry's medical tasks and accomplishments,

with a general analysis of the outstanding medical characteristics of post-war disablement. The Ministry was faced with the task of providing treatment as well as boards; artificial limbs, plastic surgery, mental and psychological treatment, sanatoriums, training for the blind, homes for the paralysed, and vocational training for the disabled were all demanded. The total British officers, nursing sisters, and other ranks, excluding Dominions and other overseas troops, who served during the war was approximately 6,000,000; at the time of the Armistice some 12·5 per cent. of these were dead, and some 10 per cent. had been discharged as disabled. By March 31st, 1930, the disablement total had increased to 27·7 per cent., or a figure of 1,664,000. The chapter discusses the various disablements for which compensation has been paid, and their stablilisation. Diseases of the heart, lungs, and brain remain at the present day the most conspicuous items in the State's liability, while the wounds, despite their greater number, have mostly healed. In the first awards made in 1920–21, wounds, malaria, and functional diseases of the heart headed the list, while as time went on tuberculosis, respiratory diseases, organic diseases of the heart, and psychoses relatively increased. Ear diseases, rheumatism, and dysentery remained remarkably even in proportion. Stabilisation was possible at an early date for wounds, amputations, malaria, neurasthenia, and functional diseases of the heart. Assessments in the 70 to 100 per cent. group are principally made up of tuberculosis and psychosis, while the "30 per cent. and under" category is largely made up of malaria, neurasthenia, rheumatism, and functional diseases of the heart. There are still approximately 113,000 pensioners whose disability has such an uncertain prognosis that the compensation cannot be stabilised. "General surgical" disabilities tend to increase in proportion towards the end of the period under review, thus showing the importance of surgical conditions as a continuing cause of institutional care.

It is impossible to do more than indicate some of the outstanding points in this extraordinarily informing and important volume; it must be consulted by all those who have any concern with the welfare of armies, and will be of great interest to all medical men.

BUDAPEST.

(FROM OUR OWN CORRESPONDENT.)

ABORTION AND BIRTH-RATE.

THE number of abortions in Hungary have more than doubled in the last 20 years; at the same time the birth-rate has fallen from 40·5 to 24·7 per 1000. The number of abortions amount to between 110,000 and 120,000 every year, and of these 70 per cent. are criminal abortions. The cause of this state of affairs is attributed to the lax standards of doctors as to indications for induced abortion. According to Hungarian law, pregnancy may be interrupted only if the life of the mother is earnestly menaced by pregnancy as such. The actual text of the law does not recognise even this indication, although legal practice has countenanced it. According to prominent Hungarian gynæcologists, the law should be revised and re-worded. In a recent lecture, Dr. Fekete, lecturer to the University of Budapest, discussed in what way the induction of abortions by qualified doctors should be regulated so as to spare the doctor from having to make difficult decisions when approached by patients. It is generally held here that to allow artificial abortion without restriction would be equivalent to national suicide. In Soviet Russia artificial abortion was declared permissible in 1920, but only in institutions, and this has not proved an ideal method of dealing with the problem. The public is not wholly aware of the dangers of abortion; the mortality amounts to 1·2–3 per cent., and morbidity follows in 14 per cent. of the cases, even if the operation is performed in well-equipped, modern operating theatres. In Hungary more than 1200 women succumb to artificial abortion every year, and 6000 to 8000 women have ill-health following the operation. Dr. Fekete pleads that the loss of population due to abortion ought at least to be compensated for by the increased care and protection given to mothers and infants. In the country the proportion of maternity beds to births is 990 to 200,000. In some places the ambulance has to carry a woman in labour a distance of 35 to 70 miles. The Hungarian system of children and infant protection is a very fine one, but it ought to be extended not only to the indigent, but also to families with small incomes.

THE BUDAPEST BRAIN RESEARCH INSTITUTE.

The Budapest Brain Research Institute was founded 20 years ago by Prof. Schaffer, who still directs its activities. Two years ago he was awarded the Ramon y Cajal international prize, and now, on the twentieth anniversary of the foundation of his institute, he has collected the more recent research work emanating therefrom into a substantial volume, dedicated to Prof. Ramon y Cajal. During the past year workers at this institute have published 143 original papers, most of which have appeared also in the German "Hirnpathologische Beiträge." Considering the critical financial conditions now prevailing in Hungary, the maintenance of such an institute is a great sacrifice on the part of the State, but owing to the high reputation of the institute, the Government is ready to continue to support it.

THE PORGES-POLLATSCHEK TEST OF PREGNANCY.

At the recent meeting of the Royal Medical Society Dr. Göczy read a paper on his experience with this test on 50 pregnant and 50 non-pregnant women. The basis of the test is a skin reaction, the skin of pregnant women being said to be less sensitive to the injection of prolan than that of non-pregnant women. The injection of 0·2 c.cm. prolan intracutaneously in women causes a bright pink reaction 2 to 3 c.cm. in diameter; this conspicuous reaction is said to be entirely absent when the woman is pregnant. Göczy has experimented also with glanduantin and præhormon, both of which hormones correspond to the prolan of Zondek, with the difference that 1 c.cm. of prolan contains 100 rat units, while an equivalent amount of the other substances contains only 30 units. The test was a failure in 15 of the 50 pregnant women and in 22 of the control cases. Similar results were obtained by other Hungarian investigators, who have arrived at the conclusion that the test is valid neither for the confirmation or for the exclusion of pregnancy.

THE VISION OF MOTOR-CAR DRIVERS.

The Hungarian Government is elaborating new rules for road traffic with a view to decreasing the number of accidents, which have recently increased in number to an alarming extent. The general health examination of drivers will also be revised and new requirements will be set up. In this connexion

Prof. Grosz has observed that the standards of sight demanded vary in different countries. Some authorities hold the view that non-professional drivers need not be examined at all. According to Prof. Grosz, the accidents which can be brought into definite causal reaction with the bodily defects of drivers amount only to 1·5 per cent. of all accidents. The number of non-professional drivers in all countries is now very high; in France it is estimated at about 1,000,000, in Belgium as 140,000. The physical examination of such large numbers of people would give rise to great difficulties. Perhaps it is for this reason that the United States, Great Britain, and France do not conduct physical examination on all drivers. This attitude is strengthened by the experiences of the insurance companies, which indicate that accidents caused by the physical defects of drivers are very rare. Even in those countries where tests for physical fitness are held, such as Germany, Denmark, Italy, Norway, and Switzerland, persons with only one eye are allowed to drive cars. In Hungary, at the present time, a higher standard of vision is required from professional than from non-professional drivers.

PROF. ERWIN TÖRÖK.

On the invitation of the central committee of the Hungarian post-graduate medical courses, Prof. Erwin Török, who now teaches ophthalmology at the New York Policlinic Medical School and Hospital, delivered some lectures here in June. Prof. Török is a Hungarian by birth; from 1899 to 1906 he acted as assistant at the clinic of Prof. Emile Grosz, who presided on the occasion of his lecture on Syphilis and Trauma, and welcomed him to Budapest.

MEDICINE AND THE LAW.

Accommodation in Mental Hospitals.

RECENT proceedings in the Chancery Division may focus public attention on the difficulty of housing what used to be called "pauper lunatics," now more happily named by statute "rate-aided patients of unsound mind." According to the Board of Control's annual report for 1929, experience shows that when there is a shortage of accommodation the admissions fall; they rise immediately additional accommodation is provided. That report described the position as "very serious" except that visiting committees as a whole were found to be increasingly aware of the need for additional accommodation to meet immediate and future requirements. More recent information, contained in a Board of Control circular issued last May, was quoted in the recent Chancery proceedings. The overcrowding as at Jan. 1st last was stated to amount to 452 beds on the male side and 1635 beds on the female side; there were only 27 hospitals with 10 or more vacant beds on the male side and only 10 hospitals with similar vacancies on the female side. The circular warned local authorities that they could no longer hope to avoid overcrowding by resort to contract accommodation. Contract arrangements were useful as a temporary measure but should not be adopted if, as frequent complaints indicated, it involved sending patients so far from their homes as to make visiting prohibitively expensive.

The case in the Chancery Division concerned the patients from East Ham which, until its incorporation in 1913, was part of Essex for lunacy purposes and sent its patients to the county institutions. In July, 1929, East Ham made an agreement with the committee of visitors of the county of Essex and borough of Colchester mental hospitals for the reception of its patients. The agreement was to remain in force (unless earlier determined by the Minister of Health) until June 24th, 1930, as from which date the East Ham corporation undertook to remove all its patients to a hospital which it would itself provide. At one time, it appears, the patients concerned under the agreement numbered 200, but 108 had been moved in the past two years. Essex and Colchester complained that East Ham had failed to carry out its undertaking; they asked Mr. Justice Eve to order specific performance of the agreement to remove the patients. East Ham admitted that it had no defence. There was a scheme on foot, provisionally sanctioned by the Board of Control, for joining with Southend in the provision of an institution. The Board, it was said, had refused to allow East Ham to provide a separate institution of its own. East Ham submitted to an order of the Court admitting the duty to remove the patients and undertaking to press on the joint scheme with Southend (see p. 330), paying meanwhile contract rates previously in force. Essex and Colchester are to have liberty to apply for a mandatory injunction if, before Jan. 17th, 1932, East Ham has not removed 25 of its patients. The rate of removal is to be 25 patients every six months, so that there should be a complete clearance in three years—the period likely to be wanted for providing the proposed joint mental hospital for which special premises and an adequately trained staff will, of course, be required. The high proportion of female patients to male patients is an added difficulty; to meet this the order directs that each batch of 25 patients removed shall consist of 20 females and five males.

The Eyesight Standard for Motorists.

The Master of the Rolls has hinted that the Minister of Transport might revise the eyesight qualification for motorists. He was delivering judgment in the Court of Appeal in proceedings arising out of the refusal of the Cumberland county council to renew a motor-car driving licence in what was evidently rather a hard case. Every applicant for a licence has to make a declaration of physical fitness. The declaration involves, amongst other things, answering a question whether the applicant can read at 25 yards in good daylight (with glasses if worn) a motor-car number-plate containing six letters and figures. The applicant frankly admitted that the letters and figures seemed blurred to him, but he could claim that he had driven for eight years without an accident, and he gave a list of various long journeys which he had made by road. He could see persons or animals on the road two or three hundred yards off and cars at a much greater distance. His statement, said Lord Hanworth, showed that he was a capital driver and a driver of experience. "It is impossible to avoid regretting that the question in the form is put in the terms stated, because it would seem that a driver of skill and care is unable to answer in the affirmative a test made for the purpose of driving but which may be ill-suited for the purpose of securing capacity and fitness to drive."

The difficulty arises over Section 5 of the Road Traffic Act as elaborated by the Motor Vehicles (Driving Licences) Regulations made last November. The declaration of physical fitness (prescribed by the Regulations) contains questions as to epilepsy, sudden attacks of disabling giddiness or faintness, and the loss of either hand or foot, in addition to the eyesight question already mentioned. The form also includes a general declaration that the applicant

does not suffer from any other disease or disability which would make him a danger as a driver. When this form has been filled up and signed, the next step depends on Subsection (2) of Section 5. Certain diseases or disabilities having thus been specified on the declaration form, "if from the declaration it appears that the applicant is suffering from any such disease or disability as aforesaid, the licensing authority shall refuse to grant the licence." To these uncompromising words several provisos are attached. One relates to invalid carriages, another to existing motorists, a third proviso gives the refused applicant a right to claim a test. But he can only claim a test where there are no such diseases or disabilities as are prescribed; the prescribed diseases and disabilities here are epilepsy, liability to sudden giddiness or fainting, and inability to read letters and figures as on a car number-plate at 25 yards in good daylight, with glasses if worn. It follows that the eyesight disability is final; if it exists, the licensing authority cannot grant a licence. Subsection (5) gives a right of appeal to a court of summary jurisdiction to "any person who is aggrieved by the refusal of a licensing authority to grant a licence." But the Court of Appeal says this does not mean that a person who is refused a licence on account of the eyesight disqualification can appeal to a court of summary jurisdiction. "It is impossible to hold that he is a person aggrieved by the refusal to grant him a licence when the licensing authority has no alternative but to refuse." The case therefore goes back to the justices in Cumberland with an intimation that they have no power to interfere; the decision of the licensing authority (refusing the licence) must stand. The Master of the Rolls nevertheless observes that the Minister of Transport, who prescribes the questions on the form of declaration of physical fitness, might well "consider whether this question is framed so as to embrace cases where defective eyesight ought to be a ground for refusing a licence to drive a motor-car, and whether it does not—as it stands—cause experienced motor-drivers to be excluded from driving when, if the question was in somewhat different terms, they would be able to satisfy all requirements as to capacity to drive a motor-car." Meanwhile, as Lord Justice Slesser remarked, there is nothing to stop the applicant trying again if he can get glasses which will fit him to read the letters and figures at 25 yards.

Deafness as a Driver's Disability.

Another recent case under the Road Traffic Act turned on the possible disability of deafness. The proceedings were under that part of the Act which relates to the driving of "public service vehicles." The Road Traffic Commissioners had refused a man a licence on the ground of occasional deafness; the magistrate's court at Birmingham allowed his appeal subject to conditions that he should always have a conductor on his vehicle and that he should wear an instrument to aid his hearing. The applicant said he was deaf only when in a quiet room; when in a motor-car, with the vibration of the engine and the noise of the traffic, he could hear perfectly. He could hear passengers speaking to him. Dr. J. S. Crabbe said that the applicant suffered from catarrhal deafness, which meant that he had extreme difficulty in hearing in a quiet room but no difficulty where there was vibration or noise.

BATH ROYAL UNITED HOSPITAL APPEAL.—It is announced that the sum of £100,000 appealed for in order to build the new hospital in Combe Park has now been raised.

DRUGS, SURGICAL INSTRUMENTS, APPLIANCES, AND FOODS.

B.M.A. EXHIBITION AT EASTBOURNE.

(*Concluded from p. 266.*)

Surgical Instruments and Appliances and Clinical Apparatus.

[9] Adair, Dutt and Co., Ltd. (Mortimer House, 37–41, Mortimer-street, W. 1), representing B. Braun, of Melsungen, showed an improved model Sphygmomanometer in a dark oak case; a Hydrostatic Dilating Set which supersedes the de Ribes' bag, using sterile pig- or sheep-bladders filled with glycerin; and sterile catgut Kuhn, claimed to be an absolutely sterile ligature material of standardised absorption-time and greater tensile strength than other catgut of similar thickness.—[60] Allen and Hanburys, Ltd. (48, Wigmore-street, W. 1), showed their latest model of the St. Bartholomew's Hospital Operating Table, with a new patent self-locking device for the Trendelenburg position and an improved head-flap, designed by Mr. T. P. Dunhill, for goitre operations; the "A. and H." Patent Knife with detachable blades and stainless steel handle; Souttar's latest improved Craniotome; a new Adenoid Plane with removable blades, designed by Mr. O. Popper; the Gastrophotor, an intra-gastric camera [1]; Kirschner's Wire Fracture Extension Apparatus and Mr. Max Page's modified pattern; Chevalier Jackson's Œsophagoscopy and Bronchoscopy instruments; Bayeux's Subcutaneous Oxygen Injection Apparatus; the Suda Bath and Chair for colonic lavage; the London Hospital Chorda Catgut, in which the iodine used is controlled to prevent any reduction of tensile strength, and the London Hospital Ligatures and Sutures.—[42] Antiphlogistine was once more shown as the best-known method for the continuous application of moist heat.—[63] Arnold and Sons (in association with Savory and Moore, Ltd., and John Bell and Croyden, 50–52, Wigmore-street, W. 1) showed the latest model of the Arnold Operation Table, with improved movement for the Trendelenburg position, an instrument-table in stainless steel, a new transformer for heating cautery burners which can be used off any supply, direct or alternating, at any voltage, and is absolutely earth-free; Mr. Frank Harvey's improved Sigmoidoscope and Rectal Speculum [2]; and a complete range of Marylebone sutures and ligatures.—[3] The British Hanovia Quartz Lamp Co. (Slough, Bucks) showed, among their light and heat lamps and accessories, the Duotherapy unit, embodying in one apparatus the Alpine sun lamp and a Sollux heat lamp; a new combination unit incorporating the super-Kromayer and the standard Alpine sun lamps, and an oto-rhino-laryngological water-cooled lamp which, unlike the Kromayer, can be used in any position and is light to handle.—[35] Campoirette, Ltd. (252, Regent-street, W. 1), showed Camp surgical supports, particularly the patent adjustment on their surgical belt which gives a very light adaptable rigid support.—[8] Cameron's Surgical Specialities, Ltd. (57c, New Cavendish-street, W. 1), gave demonstrations with the Electro-diagnostoset, which is now well known as a complete set of electrically lighted investigation instruments; and the Cauterodyne, a radio-frequency cautery scalpel.—[24] Stanley Cox, Ltd. (39, Gerrard-street, W. 1), showed an efficient and portable Autogram X ray apparatus, which automatically calculates and measures the necessary exposure; and a portable diathermy apparatus weighing only 38 pounds.—[18] H. E. Curtis and Son, Ltd. (7, Mandeville-place, W. 1), demonstrated an entirely new corset-belt, En Mains Croisées, supporting the abdominal wall by three pairs of interlacing elastic straps set obliquely at the front.—[19] C. W. Dixey

[1] See THE LANCET, July 25th, 1931, pp. 174 and 177.
[2] THE LANCET, 1931, i., 1033.

and Son, Ltd. (19, Old Bond-street, and 20, Welbeck-street, W. 1), amidst a wide range of ophthalmic apparatus, drew attention to their cases of test lenses; the Maddox, cheiroscope for training children with squint; and the Mackie slit lamp, introduced to provide an efficient, simple, sturdy instrument at moderate cost.—[65] Down Bros., Ltd. (21–23, St. Thomas's-street, S.E. 1), had a full display of surgical instruments, including Howarth's improved Chevalier Jackson's bronchoscopy and œsophagoscopy instruments with recent lens improvements; a complete selection of Meurice Sinclair's operative instruments for fractures, and new fracture instruments by Mr. Souttar; ox-bone plates and spoons by Hamilton Bailey; the up-to-date Quadrant model operation table with several important recent modifications, including an oil-pressure pump, and diathermy cautery knives and endotherms.—[25] The Dowsing Radiant Heat Co., Ltd. (91–93, Baker-street, W. 1) announced that their well-known heating apparatus can now be purchased outright or hired for long periods, and also showed the Dexter home washing machine, which uses only a quarter of a unit an hour.—[20] Fassett and Johnson, Ltd. (86, Clerkenwell-road, E.C.), together with their usual range of adhesive plasters, drew special attention to the new Ready-aid, combining a sterilised gauze pad, medicated with boric acid, attached to a strip of flesh-coloured adhesive plaster, ventilated to allow filtered air to reach the wound.—[13] The Genito-Urinary Manufacturing Co. (28A, Devonshire-street, W. 1), the sole agents for J. Eynard et Cie, Paris, and for Stilles, Stockholm, showed, among many instruments, new laryngoscopes, bronchoscopes and œsophagoscopes by V. E. Negus; empyema drainage-tubes by A. Tudor Edwards; Kidd's new model automatic boomerang stitcher; the diathermy knife, and radium instruments.—[1] The Holborn Surgical Instrument Co., Ltd. (26, Thavies Inn, E.C. 1), emphasised the advantages of their new twin-pump operation table fitted with a pedal whereby the surgeon can produce the Trendelenburg position without using his hands; Stutzer's patent surgeon's stool, on which the surgeon sits in a comfortable saddle and can tilt himself forward by a foot lever; the Brilite tongue spatula, with a lamp in the handle, reflecting light along the specially polished glass tongue-depressor; the Protector uterine forceps, which seize the cervix without lacerating it, and which can be hooked into the Schonenberg self-retaining speculum; and an improved form of Simpson's lithotomy straps in the form of canvas boots so that the legs are not cut.—[29] Johnson and Johnson (Great Britain), Ltd. (Slough, Bucks) displayed a range of ligatures, sutures and other appliances, including the well-known "K. Y." jelly; the Tek toothbrush, with a small head to get inside the dental arch; and Johnson's baby products. [49 and 61] Mayer and Phelps (59–61, New Cavendish-street, W. 1) had a large selection of instruments and appliances on view, including the M.P. clinical lamp designed for the obstetric wing of University College Hospital—a useful lamp for general examinations; Lambert Roger's skull plough with electric motor; Prof. D. Dougal's new model for teaching obstetrics to a class—a porcelain sink with basin shaped like the posterior half of the uterus; and an improved breast pump in which the milk is drawn through a wide aperture into the bottle, which is boilable.—[23] Rayner and Keeler, Ltd. (100, New Bond-street, W. 1), among their display of ophthalmic instruments, drew attention to their full range of retinoscopes and ophthalmoscopes; the Edridge-Green colour perception lantern and bead-box test; the internally illuminated drum test type, and a luminous object perimeter-scotometer. [14] A halometer and a tonsil suction apparatus by Dr. F. C. Eve, and an inhaler for open ether administration by W. Stanley Sykes.—[52] Short and Mason, Ltd. (Aneroid Works, Walthamstow, E. 17), in addition to the familiar Tycos sphygmomanometers and thermometers, showed the Tycos venostat for blood shunting—throwing a substantial part of the blood out of the general circulation—in heart failure and cardiac asthma; the Tycos dermatherm, for accurate measurement of surface temperatures, and apparatus for tubal insufflation.—[40 and 41] T. J. Smith and Nephew, Ltd. (42, Tavistock-square, W.C. 1), presented Elastoplast, an elastic adhesive strapping which is already a favourite treatment for varicose ulcers and veins, and many sprains and other injuries; and also Cellona, an entirely new plaster-of-Paris bandage which is light and clean, somewhat elastic and easily cut, and which can be completely moistened in plain water in a few seconds.—[80] Edward Taylor, Ltd. (Salford, Lancs), showed their range of adhesive and medicated plasters, including Flexoplast, a self-adhesive antiseptic elastic bandage; Emergoplast, a simple dressing for immediate application to minor injuries, which is supplied with various medications, with and without perforation, full spread or part spread; and zinc oxide plaster spread on white wool felt of three different textures.

Books.

[12] Baillière, Tindall and Cox (7 and 8, Henrietta-street, Covent Garden, W.C. 2) were showing "Quantitative Clinical Chemistry," by J. P. Peters and D. D. Van Slyke; "Bioassays," by J. C. Munch; "Annals of the Pickett-Thomson Research Laboratory," Volume VII.; "Leonardo Da Vinci," by J. P. McMurrich, and some new volumes in the Students' Aids Series.—[39] J. and A. Churchill, Ltd. (40, Gloucester-place, W. 1), drew attention to Bowlby and Andrewes' "Surgical Pathology and Morbid Anatomy," revised by Geoffrey Keynes; Rogers and Megaw's "Tropical Medicine"; Romanis and Mitchiner's "Surgical Emergencies"; Osgood and Haskins' "Text-book of Laboratory Diagnosis"; and to a number of new volumes in the "Recent Advances" series, which now numbers 28, notably Gray's "Allergy," Beaumont's "Medicine," now in its sixth edition, Findlay's "Chemotherapy" and Imms's "Entomology."—[6] Constable and Co., Ltd. (10 and 12, Orange-street, W.C. 2), had on their stand "The Practical Treatment of Diabetes," by T. Izod Bennett; "The Metabolism of Tumours," by Otto Warburg; "The Social Control of the Mentally Deficient," by Stanley Powell Davies; and "The Modern Medical Monographs" series.—[21A] The Food Education Society (29, Gordon-square, W.C.1) displayed a number of books and pamphlets on diet and domestic subjects, including "Children's Diet," by Charles Hecht; "Vegetables: Their Use, Abuse and Neglect"; "Life without Servants," by Harold Begbie, and "The Truth about Fat."—[43] H. K. Lewis and Co., Ltd. (136 and 140, Gower-street, W.C. 1), pointed out "Diseases of the Tongue," by W. G. Spencer and Stanford Cade; "The Physical and Radiological Examination of the Lungs," by James Crocket; "The Alcohol Habit and its Treatment," by W. E. Masters; "Fundamental Principles of Ray Therapy: An Elementary Text-book for Nurses, Students and Practitioners," by William Beaumont; "A Text-book on the Nursing and Diseases of Sick Children," edited by Alan A. Moncrieff, and also many varieties of medical stationery.—[31] The Oxford University Press (Amen House, Warwick-square, E.C.4) selected for special recommendation C. B. Heald's "Injuries and Sport: A General Guide to the Practitioner"; Hurst and Stewart's "Gastric and Duodenal Ulcer"; new editions of Ker's "Infectious Diseases," Still's "Common Disorders and Diseases of Childhood," Wright's "Applied Physiology," and Price's "Text-book of the Practice of Medicine," "Bibliotheca Osleriana," and William Brown's "Science and Personality."

Spas, Hospital Furniture, and Miscellaneous.

[5] Buxton showed photographs of their hot and natural baths and therapeutic establishment, pointing out that a "cure ticket" for a period of three

weeks, covering all treatments prescribed, can be obtained for three guineas.—[32] R. H. Dent (309, Oxford-street, W. 1) showed further developments of his Ardente hearing aids, particularly the new "snug" type of earpiece which fits into the orifice without getting hot; and the new stethoscope for deaf doctors, smaller than the original but more sensitive. Ardente auditorium sets are now installed in many churches.—[21] The Eastbourne Gas Company (87–89, Terminus-road, Eastbourne) showed photographs of practical uses of gas in hospitals; an incinerator; and the Indusa heater for large apartments.—[75] General Acoustics, Ltd. (77, Wigmore-street, W. 1), showed Acousticon aids for the deaf, including electrical and non-electrical apparatus, and the Dime earpiece, which is moulded to the exact shape of the ear.—[27] Harrogate, in drawing attention to its great diversity of spa waters, stressed the mud (Fango) treatment given from a recently discovered bed in the medicinal water-bearing strata, and also the system of training and certification of nursing staff.—[2] Hoskins and Sewell, Ltd. (Bordesley, Birmingham), showed beds, cots and fracture apparatus, particularly the St. Bartholomew's patent wind-up mattress cot, which can be wound up at either end, or the whole mattress can be raised to waist-level for demonstration purposes; the wheeling ward beds have several cunning devices so that a bed can be wheeled in any direction; Hoskite wheels and the Hoskins patent high-pressure lubrication make wardwork simpler, and Goldex and Silvex are pleasing modern metallic finishes for nursing-home or nurses'-home beds.—[71] Kolynos Incorporated (Chenies-street, W.C. 1), presenting their familiar dental cream, drew attention to liquid Kolynos as a mouthwash or spray and Kolynos denture powder for artificial teeth.—[64] The Medical Insurance Agency (B.M.A. House, Tavistock-square, W.C. 1) was represented by officials ready to give advice on all matters of insurance, and reminded visitors of the large grants given by this agency to medical charities every year. An innovation on this stand was the presence of the manager of the B.M.A. (Tavistock-square) branch of the Westminster Bank, who gave information about stocks and shares, wills, trusts, settlements, and other banking matters.—[10] The Medical Sickness, Annuity and Life Assurance Society, Ltd. (300, High Holborn, W.C. 1), had their usual stand to remind visitors that there is an insurance society managed by doctors for doctors.—[16] Pepsodent Co. (8, India-street, E.C. 3) displayed their well-known acid dentifrice.—[38] "The Practitioner" (6–8, Bouverie-street, E.C. 4) was a newcomer to the exhibition; particular attention was invited to the July special number on fractures and accidents.—[26] Thermega, Ltd. (51–53, Victoria-street, S.W. 1), showed electrically heated cushions and blankets and couches, with special reference to a warmed couch-mattress which does much to encourage muscular relaxation.—[50] Whitfields Bedsteads, Ltd. (109 to 125, Watery-lane, Bordesley, Birmingham), invited interest by their Lawson Tait patent cardiac bedstead as designed for Sir Thomas Lewis at University College Hospital; Lawson Tait Barnet maternity bedstead with basinette, as designed for the Wellhouse Hospital, Barnet; and the new Meurice Sinclair's patent portable fracture apparatus for fixing to any bedstead. Also displayed on this stand was the Harco sponge-rubber mattress, a great improvement on the old water-bed or air-bed, with a loose cover made of acid-proof waterproof sheeting which can be removed for sterilisation (Cassell, Andrews and Co., Ltd., Hardman-street, Manchester).

PUBLIC HEALTH SERVICES

REPORTS OF MEDICAL OFFICERS OF HEALTH.

THE following are 1930 statistics of six boroughs:—

Name of district and estimated mid-year population.*	Birth-rate.	Death-rates per 1000 of the population.					Death-rates per 1000 births.		
		All causes.	Tuberculosis.	Cancer.	Respiratory diseases with influenza.	Heart disease.	Infant and neonatal mortality.	Young child (1–5 yr.) mortality.	Maternal mortality in childbirth.
Swindon .. (62,020)	15·7	10·8	0·84	1·56	1·0	2·6	63·43	20	2·1
Cambridge .. (60,730)	12·5	11·2	0·61	1·37	1·4	1·7	40,28	28	5·3
Gillingham .. (56,670)	14·8	11·1	1·00	1·77	1·0	2·6	41,22	—	6·2
Poole .. (56,150)	16·7	12·4	0·96	1·87	1·4	2·2	58,35	20	5·3
Watford .. (55,870)	15·4	9·5	0·84	1·48	0·8	1·9	46,33	—	2·3
Darwen .. (37,780)	11·6	12·5	0·26	1·56	1·7	2·5	70,39	—	6·8

Registered stillbirths per 100 live births: Swindon 4·3, Gillingham, 3·6, Poole 4·0, Darwen, 5·5.
* As a rule the estimate (R.-G.) for 1929 has been used.

Swindon.

Dr. Dunstan Brewer says that, although the year 1930 was a healthy one for the country as a whole, it was not so in Swindon. Infant mortality was high; the general mortality was no better than in recent years, and certain diseases were more prevalent than usual and showed a higher fatality. The chief events of 1930 were the reconstruction of the administrative block at the isolation hospital; the building of an adequate maternity hospital; the opening of a new wing of the Victoria Hospital; and the decision to proceed with a scheme for an additional water-supply from Latton. The higher infant mortality-rate was due to neonatal deaths at one period, the deaths subsequently being low. The mortality-rate among pre-school children was also low, but at the school age the rate was unfavourable. All deaths under 20 were made the subject of inquiry, where the medical history of the person was known to the health department. There were 124 such deaths, and of these 11 were due to congenital defects, 7 to measles, 11 to whooping-cough, 9 to diphtheria, 9 to rheumatic infection, and 24 to prematurity. Dr. Brewer adopts the unusual custom of making epidemiological forecasts, which are printed in the health committee's minutes month by month. These forecasts, some of which prove to be right and some wrong, are founded on a study of the local behaviour of disease and its variations in type and of the position of the disease in other parts of the world. Dr. Brewer is hoping that in the future it may be possible to forecast the behaviour of disease as accurately as that of the weather. There were 100 cases of true diphtheria with the high case-fatality of 9 per cent. Both deaths due to and notifications of non-pulmonary tuberculosis, other than meningitis, were higher than usual. Dr. Brewer believes that the higher notifications are in part due to the notifications of enlarged glands found during abdominal operations. He is not satisfied that we are getting a grasp of tuberculosis, and suggests that elaborate registers have confused the issue. He welcomes the latest Tuberculosis Order (1930).

Under the Housing Act programme 500 new houses are to be erected, 50 of which will be allocated to rehousing persons displaced by closing or demolition orders. Housing in Swindon is exceptionally good for an industrial town. The amount of overcrowding is not great but does not diminish. The chief hospital lack is for general medical cases, although the new

wing at the Victoria Hospital provides some beds for this purpose.

Cambridge.

Dr. Andrew J. Laird says that inhabited houses number 16,215. The five-year housing programme provides for 260 new houses per annum to be erected by the corporation, of which 60 are to be set aside for tenants selected by the health committee from houses demolished and in need of substantial renovation, and from overcrowded houses, in which the tenants cannot pay the rent of a council house and where there are families of young persons. The applicants for municipal houses at the end of 1930 numbered 1511. Caravan dwellings have increased in number during recent years. They are provided with pail closets and stand on unpaved surfaces. Dr. Laird suggests that it may be necessary to provide special parking places, with all necessary requirements, and to prohibit caravans elsewhere. The scheme of Mr. W. B. Grandison, the public dental officer, for the enrolment of mothers and young children to secure regular attention to their teeth continues to grow. During the year 80 mothers took advantage of the treatment offered during pregnancy, and 380 children under school age, an increase of 66 on the previous year, were enrolled, and will be examined and treated every six months or oftener. Mr. Grandison finds that the regular and frequent application of ammonical solution of nitrate of silver and formalin by Howe's method is particularly efficacious in preventing the progress of dental disease in pre-school children.

Gillingham.

Dr. William A. Muir says the shortage of houses is undoubtedly less acute but that about 6 per cent. are overcrowded, according to the standard of two adults per bedroom. The prospects of demolishing unfit properties are better now than for many years. Gillingham, being a town of recent origin, has no slum areas, and its five-year programme only deals with individual unfit houses. At the last census inhabited houses numbered 10,859, and the requirements for the next five years are set down as 600 houses for the relief of overcrowding, 120 to replace demolished houses, and 800 for increase of population. Overcrowding in most cases is due to the shortage of houses, and not to inability to pay the rents of available houses. It has been found more satisfactory in Gillingham to deal with housing defects under the Public Health Acts rather than under Section 3 of the Housing Act, 1925. A local Bill is being promoted to prohibit tents, vans, sheds, &c., from being placed on any land without the previous approval of the corporation.

The corporation now supervises children boarded out under the Children Act, and at the end of the year there were 24 registered foster-mothers, one of whom was fined for failure to notify that she had received a foster-child. In October the borough took over the supervision of midwives. The appointment of Dr. Meta Dunlop as a full-time assistant has enabled antenatal clinics to be established, which were attended by 75 new cases during the last half of the year. The council has also approved the giving of contraceptive advice in cases where pregnancy would be detrimental to health. To begin with, there will be no regular clinic, but appointments will be made for attendance at special sessions at one of the centres. In the spring of 1930 a nuisance arose, which had only been partially remedied when Dr. Muir's report was written, from a new process adopted by a cement factory, resulting in an increased emission of dust in the neighbourhood.

Poole.

Dr. R. J. Maule Horne's report shows that Poole is growing rapidly. At the 1921 census the houses numbered 9400, and since then 4562 houses have been built. Over three miles of new water-mains were laid during 1930, and the sewer extensions have difficulty in keeping pace with the house building. In 1926 there were 490 cesspools; the figure rose to 781 in 1928, and has decreased in 1930 to 662. This exceptional rate of development is a menace to the pine-clad areas, and Dr. Horne is anxious that no tree be sacrificed unnecessarily. About 30 years ago the first blades of rice grass (*Spartina Townsendii*) were found in the harbour, and now some square miles are covered by it. It is an excellent binder for low-lying foreshore land. Poole is well off for parks and swimming facilities. The cleansing and scavenging systems are being reorganised, and it is intended to adopt the Bradford system of controlled tipping. One of the needs is a model lodging-house, which would cater for the visiting seamen.

The public analyst, Mr. William Partridge, reports that the town is badly served in the matter of butter. Well-made butter contains between 10 per cent. and 13 per cent. of water. Of 15 samples analysed during the year, 13 contained from 14·8 per cent. to 16·0 per cent. of water, and of the other two samples one contained 13·6 per cent. and may have been a dairy butter, while the other contained 14·3 per cent. and might be a factory butter or a badly made dairy butter. A huge traffic is done, says Mr. Partridge, in buying dry butter and incorporating water to the maximum, but there is no power to take action, even if it is known that the butter is weighted with water. The municipality took over the supervision of boarded-out children on April 1st, and there are 63 boarded-out children on the register. A table given by Dr. Horne shows that since 1907 the deaths of pre-school children have declined in number even more than the infant deaths.

Watford.

Dr. William J. Cox's report shows that there were 9944 houses at the census of 1921, and that the borough has conducted an active municipal housing campaign since 1916. The slums are grouped around the High-street. Some of the worst have been demolished. In 1924 the Ministry sanctioned the building of 114 houses on the Wiggenhall estate for slum tenants. All the tenants did not accept the offer, and this enabled 114 houses to serve for 152 demolished during 1924 to 1928. It is intended to deal with 199 houses in clearance areas and one other house during the next five years, and it is hoped to deal with at least 130 during the present year. In addition, 400 houses are to be built to relieve shortage. The Watford Joint Isolation Hospital (66 beds) is inadequate for the population of 100,000 which it serves. Dr. Cox urges strongly that the diphtheria ward, for which plans have been drawn, should be proceeded with at once. Dr. Cox inspects most of the schools in his district on behalf of the county council. He shows that, owing to the tact and energy of the school nurse in following up, nearly all the parents obtained treatment for the defects found in their children, and that there has been a very great improvement in the cleanliness of the children since the early days of medical inspection.

Darwen.

Dr. James Robertson gives cotton-weaving, paper-making, fireclay- and iron-workers as the chief occupations. Trade is depressed, and the population is estimated to have declined by 1000 since the 1921 census. There is no hospital accommodation in the borough for any but infectious diseases. The Queen's Park Hospital, Blackburn, is the public assistance infirmary for Darwen. General medical and surgical cases are admitted to Blackburn Royal Infirmary. The only common lodging-house is a municipal one. Owing to trade depression and the decrease in the number of vagrants, due to the Unemployment Insurance Acts, there was a decline in lodgers of about 12 per cent., and 15 aged and infirm lodgers were admitted to the public assistance institution. The clearance of the Bury-street area is now practically complete, and, apart from this, there are only small groups of scattered houses requiring to be demolished. Dr. Robertson says that the majority of the ground floors of existing houses are flagged, and that the chief trouble is dampness owing to the lack of subsoil

drainage. It is estimated that during the next five years 243 houses will be repaired under Part II. of the Housing Act, 1930.

There are 73 cowkeepers on the register, and extensive improvements have been carried out at the dairy farms, at an estimated cost of about £2000. The bed of the River Darwen is held to be a nuisance, owing to the deposit of rubbish. The whole of the bed needs pitching and the portion near dwelling-houses and shops should be culverted.

INFECTIOUS DISEASE

IN ENGLAND AND WALES DURING THE WEEK ENDED JULY 25TH, 1931.

Notifications.—The following cases of infectious disease were notified during the week:—Small-pox, 36 (last week, 50); scarlet fever, 1526; diphtheria, 838; enteric fever, 59; pneumonia, 521; puerperal fever, 43; puerperal pyrexia, 94; cerebro-spinal fever, 30 (last week, 43); acute poliomyelitis, 10; acute polio-encephalitis, 1; encephalitis lethargica, 9; continued fever, 1; dysentery, 7; and ophthalmia neonatorum, 106. No case of cholera, plague, or typhus fever was notified during the week.

The number of cases in the Infectious Hospitals of the London County Council on July 28th–29th was as follows: Small-pox, 58 under treatment, 2 under observation (last week, 62 and 2 respectively); scarlet fever, 1231; diphtheria, 1513; enteric fever, 13; measles, 138; whooping-cough, 396; puerperal fever, 36 (plus 9 babies); encephalitis lethargica, 208; poliomyelitis, 1; "other diseases," 124. At St. Margaret's Hospital there were 16 babies (plus 7 mothers) with ophthalmia neonatorum.

Deaths.—In the aggregate of great towns, including London, there were no deaths from small-pox, 1 (0) from enteric fever, 18 (1) from measles, 2 (0) from scarlet fever, 13 (3) from whooping-cough, 19 (3) from diphtheria, 39 (11) from diarrhœa and enteritis under two years, and 14 (1) from influenza. The figures in parentheses are those for London itself.

Five of the deaths from measles were reported from Barnsley and four from Liverpool. Three fatal cases of diphtheria were notified in Liverpool, which also reported five deaths from diarrhœa and enteritis under two years. Of the other deaths from this cause four were in Sheffield, three in Sunderland, and two in West Hartlepool. Three deaths from meningococcal meningitis were notified in London, one in an infant, and the others in age-groups 15–35.

The number of stillbirths notified during the week was 247 (corresponding to a rate of 36 per 1000 births), including 42 in London.

PANEL AND CONTRACT PRACTICE

POSITION OF NATIONAL HEALTH INSURANCE.

DEBATE IN HOUSE OF COMMONS.

An important debate on sickness certification and other problems of national health insurance took place in the House of Commons on July 29th, arising out of a vote of £13,116,212 for salaries and expenses of the Ministry of Health.

Sir KINGSLEY WOOD (formerly Parliamentary Secretary to the Ministry of Health) said he wished to draw attention to certain grave and disturbing aspects of national health insurance, and particularly to the very heavy sickness and disablement experience which had now prevailed for a considerable period. This matter was not only of national importance, but was giving considerable anxiety to the societies themselves and to all who desired to see national insurance maintained on a safe and stable basis. The system had proved of great use and worth to the nation. The total amount paid out in the last year for which they had figures, including the Exchequer contribution from the Ministry of Health Vote, was some £35,000,000, and medical benefit cost some £8,700,000. Of that sum insurance doctors received some £6,256,000, and nearly £2,000,000 was paid to insurance chemists for drugs and appliances. There was paid in sickness benefit some £11,250,000, in disablement benefit some £5,350,000, and in maternity benefit another £1,440,000. The decline in the mortality-rate had been one of the most satisfactory features of the century. Medical science had progressed al ong way in recent years; many diseases had been successfully grappled with, and a very great deal had been attained by medical research. Yet in spite of this there had been a marked and striking increase in claims of insured persons for sickness and disablement benefits and in the consequent expenditure on those benefits. This process had been going on since 1925, and while there was some improvement in 1928, as compared with the high rate of 1927, this improvement was not maintained. Last year there was some improvement, though not a very considerable one, but in 1929 there was a serious epidemic of influenza, and, therefore, not much encouragement could be drawn from the figures for 1930. No one who had studied the subject would say that the problem was by any means solved, or that further immediate steps were not urgently needed.

A DISQUIETING SITUATION.

There were three grave and arresting factors in the present situation. The first was the adverse experience which the approved societies had suffered and the claim experience in respect of married women. In fact, the societies had been affected so seriously that the valuers in some instances, quite recently warned the societies that unless conditions improved to a marked extent the whole of the present surplus would be exhausted within a few years in providing ordinary benefit. A number of societies which specially catered for married women would have to cancel their additional benefit schemes—a very serious step indeed. Already a number of societies had cancelled such schemes. The Government actuary, in his report to Parliament a short time ago, stated that the claims of unmarried women had risen by 60 per cent. so far as sickness benefit was concerned, and the claims of married women had risen by 106 per cent. As regards disablement benefit, Sir Alfred Watson stated that the claims of unmarried women had risen by 100 per cent., and those of married women by 159 per cent. Another very curious feature was this: that among males it was the younger insured persons rather than the older whose burdens cast upon the approved societies had increased in recent years. The third factor was that the excessive claims, as far as a large proportion of insured persons were concerned, were more in the North of England than in the South. The following figures, which had been presented to the Ministry of Health, were very extraordinary and illuminating in regard to causes of incapacity: Excess per cent. of the northern area over the southern area—rheumatism, 50; nervous and mental disorders, 41; digestive disorders, 21. These were remarkable and difficult things to explain. Obviously, in connexion with a very large proportion of the population, unemployment and bad health must be considered con-

tributory factors, but let no one think that this great increase of claims was due to deterioration in the national health. This was borne out by the Minister of Health himself. Could anything be done to prevent what was the real danger of the national health insurance system degenerating into an unfortunate position similar to that of the unemployment insurance system?

Since the House last discussed this question the Minister of Health had taken two very important steps in the right direction. He had endeavoured to strengthen the safeguards to be adopted by societies in connexion with the supervision of claims, and he had very strongly urged on approved societies the importance of maintaining an efficient system of sickness visitation; and, secondly, an early reference to the regional medical officers for examination of claims. The Minister had also taken certain steps with respect to the medical profession, and he (Sir Kingsley Wood) was in agreement with him there. Some advice, and, if necessary, some reminder, was required in that connexion. An amending regulation had been made with regard to change of doctor. That change had been made for obvious reasons, and he thought that anyone who had been associated with approved society administration during the last two or three years would agree that the change was very necessary. He asked the Minister whether he proposed to take further steps. Useful and desirable as the steps that he had taken might be, it was difficult to feel confident that sufficient had been done to rescue the national health insurance system from its present position.

NEED FOR HIGHER STANDARDS.

Mr. RHYS DAVIES said that up to date the approved societies had lost a sum of £25,000,000 as a result of the economy Act passed by the Conservative party. That would be sufficient to put all the societies in a sound financial position. Sir Kingsley Wood had made no criticism of the medical profession, and had also avoided dentists, opticians, and surgical appliance makers, all of whom seemed to have their eyes keenly fixed on the funds of approved societies. Sir Kingsley Wood was inclined to blame the 17,000,000 insured persons. He (Mr. Davies) hoped to prove that some of the blame rested with other people. He was satisfied that the standard of honour in relation to claims from the insured population, from the medical profession, the dentists, the opticians, and so forth, must be raised and improved, otherwise the scheme would ultimately fail in its objects. There was something fundamentally wrong in the relationship between the medical profession, the Ministry of Health, and the approved societies. There was no doubt at all that some members of the medical profession issued certificates that were absolutely unjustifiable. He had reason to pay tribute to the high skill and genius of the medical profession in this country, but this high skill did not enter into their business and administrative work. He thought that it should be brought home to the doctors the amount of damage that might be done to the funds of approved societies by the issue of certificates which ought not to be issued. The same remark applied to the dental officers. He had come to the conclusion that there was no way out of these difficulties until the doctors were in some way employedby the State.

EFFECT OF THE DEPRESSION.

Dr. MORRIS-JONES said that the excessive claim for sickness benefit under the national health insurance system was probably, apart from the deficiency in the unemployment insurance fund, the most serious matter with which Parliament and the Government had to deal at the present time. He was convinced that there was a tendency among all classes of the population, insured and others, to get as much as they possibly could. The next great factor was the serious economic position in the world, and especially in this country, and the unemployment position. It was not possible for a man who was a long time out of work to be really healthy. He was not now engaged in panel practice, but he had a long experience of it, and he considered that one great cause of the present position under this scheme was the economic depression which was affecting the physical and mental health of the insured population. If the House agreed with that view they would not agree that the medical profession, in the circumstances, was so much to blame. There was no more difficult problem before the profession at the present time than this question of sickness claims among insured persons, and its members were as alive to their responsibilities as the approved societies. There was one cause of the increase of sickness claims among women—namely, that a woman might still be able to do housework in her home, although she had been certified as incapable of following an outside occupation. From many years' experience he knew that very often, where a certificate had been given showing that a woman who was insured was not fit for an occupation in which she was insured, she was engaged in household work which in many cases would be as arduous as the occupation in respect of which she was receiving benefit. How that was to be dealt with was a problem, but it was responsible for a great deal of leakage under the national insurance system. He did not think that an inspector of an approved society should be allowed to dissect and analyse medical certificates, but he suggested that the Ministry of Health should state categorically that no insurance certificate should be accepted for such a thing as a cold or a chill. The phraseology of certificates should be more specific in character.

THE MINISTER'S MEMORANDUM.

Mr. MELLER congratulated the Minister on the issue of memoranda, both to the approved societies and to the medical profession, which dealt very faithfully and frankly with the situation with regard to national health insurance. He (Mr. Meller) approached this subject with the very deepest respect for the medical profession, and there was no need for the medical profession to be troubled because the Minister had come to the conclusion that the state of affairs demanded some explanation. He thought the Minister was justified in bringing to the notice of the medical profession some of the results of the experiments and examinations which had been made, and in asking them to see whether there was something inherently wrong in the system itself, or whether there was something wrong with the health of the people of the country. Very nearly £9,000,000 was spent on medical treatment and medicines for the insured population. That was a vast sum to be spent on some 15,000 medical practitioners who came under the Act. Therefore they were entitled to ask this honourable profession that they should give a service worthy of the profession, with full honesty and due regard to the insured persons. Reference had been made in the debate to some of the causes of incapacity stated on medical certificates. There was loose certification certainly among some members of the profession, and quite recently he saw a certificate which contained the initials "I.D.K.," which he believed meant "I don't know." When a professional

gentleman descended to that sort of thing there was cause for complaint.

Miss WILKINSON: Does the hon. Member object to the medical profession being honest occasionally?

Mr. MELLER said that he should have said that the certificate was hardly honest, and a little misleading, because he only surmised that "I.D.K." meant "I don't know." There was another certificate in reference to a person incapable of work for some weeks, stating that he was suffering from abrasion of the ribs, and it appeared that during the time he was upon the funds he engaged in a heavyweight boxing contest, and laid out his opponent in the fifth round. That sort of thing was, of course, unsatisfactory, but he did not claim that it was a typical sample of what was being done. On the contrary, very excellent service was given by the medical profession as a whole. He hoped the Minister would join in an exhortation to the medical profession to try and find out the cause of the present situation, and see whether it was in fact due to the bad health of the people or to something else.

In 1922, in England and Wales, 113,000 cases were referred for examination, and the figures gradually rose until, in 1930, 531,000 cases were submitted. Of the cases submitted for examination in 1922, 40 per cent. were found to be still incapable of work; 60 per cent. of the cases declared off, either because they did not attend for examination, or were found by the medical referee to be capable of work. One would have thought, if certification was going on in the very best way, that, as they began to increase the number of references, the number of persons found incapable of work would be increased also, and that those capable of work would have become less. But that was not so. When 531,000 persons were referred for examination only 34 per cent., as against 40 per cent. in 1922, were found incapable of work. The statements by the Minister in his Memorandum were a serious and grave indictment, whether against the insured person, the medical profession, or the approved societies. He was not attempting to lay a charge at the door of any one of the three, but it should go out from the House of Commons with a very loud voice that something had to be done to repair this state of things. It was not only a reflection on the medical profession, but a reflection upon the moral honesty of the people. If there was a good and honest reason for these things then they ought to know it, and he was sure that the Minister of Health would be only too glad to withdraw the allegations contained in the Memorandum. Arising out of the examinations, one thing stood out pre-eminently—namely, that the increase in the sickness experience was greater among married women than any other class. If married women stood alone their scheme would be insolvent. This matter had been considered by a body outside, and they stated that if the scheme with regard to married women was to be put upon a satisfactory basis, and married women were to be accepted as an insurance proposition, there were three courses open—namely, to increase the contributions to meet the risk, or to reduce benefits, or to deal with the matter somewhat on the lines of the present system; that was to say, when a woman married she must pass out of insurance, and if she subsequently entered the employment market, she must requalify for benefit. During the time of requalification a limited sickness and maternity benefit would be provided. He hoped the Minister would consider that particular point. Another point which deserved the attention of the Minister was the effect of a high sickness experience and a low contribution record. They could not keep the societies on a solvent basis if they put upon them the responsibility of providing full benefits while their contributions were declining. He hoped the Minister would do something to meet that situation. Apart from the drain upon the funds of approved societies through a sickness experience greater than had been expected, there was no more important matter to consider than the position of those persons who, if no assistance was forthcoming from the Government, would find their health insurance in jeopardy.

RESPONSIBILITIES OF THE PROFESSION.

Mr. THOMAS LEWIS said he thought the medical profession would say that a good deal of the increase of sickness was due to the reduced stamina of the people. Unless there was a marked change in our economic conditions the sickness experience would become worse, and, therefore, it was exceedingly important that societies should retain all their funds. His complaint was that the Ministry were endeavouring to force societies to adopt methods of sickness visitation and do work which the doctors would say was work which they alone ought to do. Except in rare instances, it should be the duty of the panel doctor to decide whether a person was entitled to be on the funds or not. He asked the Minister at the earliest possible moment to restore the amount which was stolen from the approved societies by the last Government.

Mr. PALMER said that panel practitioners ought to feel no less than the administrators of approved societies their responsibility for establishing the soundness of the health insurance scheme. He would like to feel that the medical profession were helping to prevent any "monkeying about" and people getting benefits to which they were not entitled. There was a difference between a doctor's certificate to establish a pensions claim and a type of certificate in respect of a claim for benefit under an approved society. It seemed to him that the medical profession could do, under the terms of certification, exactly what one was prepared to pay them well enough to do. He urged that every measure of coöperation should be tried before they got to the point of cutting benefits.

Miss RATHBONE said she would like to put forward one explanation of the excessive claims of married women. In every time of depression in industry it was the married woman who felt the pinch. The decreased state of health of married women through that cause was one of the reasons for the increase in their claims.

Miss SUSAN LAWRENCE (Parliamentary Secretary to the Ministry of Health) said Miss Rathbone was right when she said that times of unemployment and stress pressed most hardly on the mother in the home. She thought Mr. Meller was a little hard on the medical gentlemen to whom he had referred. The doctor who wrote "I.D.K." on the certificate was a person she regarded with some liking. It was very much the same thing as when a general practitioner said that he required a second opinion. She was certain, knowing a little about the society to which Mr. Meller had referred, that if the certificate came in it was received in exactly that sense, and that a second medical opinion was hurried to the bedside of the patient. It was the business of the Ministry of Health to try to assimilate all the various points of view. After long and careful reports the Ministry had come to the conclusion that, making every allowance for the effects of unemployment and depression, the whole of the sickness claims made on approved societies could not be altogether accounted for by those causes. The last circular was sent out by the Ministry on May 31st last, and the Ministry was holding conferences with

the approved societies. It was rather early to suggest any further measures. The central fund was not in a very good position. It reached a maximum of over £1,500,000, but it had since been seriously depleted owing to the necessity of making grants to societies who were in a deficiency through causes beyond their control. That was a serious matter, and the financial position of the fund was engaging the earnest attention of the Minister. It was possible that a levy might be one of the subjects to be discussed, but that was a matter for further consideration. She could not give any more definite information at the moment. With regard to the third valuation, a number of societies had found their disposable surplus reduced, and some of them had been compelled to curtail additional benefits previously provided. The financial basis of the insurance scheme would have the careful attention of the Minister in the near future. With regard to the prolongation of insurance, the Ministry was now in conference with the approved societies and the Minister hoped to be able to announce a decision very soon on the matter.

MORE DRASTIC STEPS.

Sir T. INSKIP said he was sorry that Miss Lawrence was not able to give the Committee a little more guidance. A question which she did not wholly face was what the Minister was going to do about the present position. He had called attention to the necessity or desirability of doctors being, perhaps, a little more careful, but the position called for something more definite and more drastic than a mere suggestion of that sort. Mr. Rhys Davies had suggested that the doctors should be brought more in touch with the consequences of their certificates, and that they should be made to realise how much money depended on the grant of a certificate. He (Sir T. Inskip) was not sure that that was the right way to enable the doctors to do their duty. A doctor should use his medical skill by addressing his mind to the condition of the patient, and not by considering what might be the consequences, great or small, of granting a certificate. The hon. Member had also suggested that the medical service should be nationalised. He did not believe that any doctor in the House would agree with the proposal, and he did not envy the task of the Minister of Health if such a proposal were ever adopted. Two other proposals which had been made were rather more helpful. One was that a little more attention should be given to sick visitation, and the other was that the operation of the regional medical staff should be speeded up. He was sorry to hear Miss Lawrence say that a levy upon the central fund was under grave consideration. The result of such a levy would be to make the good societies pay for the lax administration of the bad societies. The central fund existed for well-defined purposes, and the Minister ought to be quite certain that he had exhausted all the possibilities of improving the administration of the societies in relation to claims before he allowed any such levy.

PATIENTS' GRIEVANCES.

Sir E. GRAHAM-LITTLE said he wished to make an earnest appeal to the Minister to reconsider certain points of prime importance. They ought to make the medical service under national health insurance approximate as closely as possible to the conditions of private practice. The latest regulation in regard to the change of panel doctor was seriously disliked by the medical profession, and a unanimous resolution was passed at a representative meeting protesting against that particular restriction. The psychological effect of a free choice of doctor could hardly be overestimated, and he was sure that the Minister had not considered that aspect sufficiently. It was one of the facets of the problem which would be disastrously affected by a State medical service. He asked the Minister to give his attention to the difference in the treatment between private and insured persons, represented by the limitations of panel prescriptions. He hoped the Minister would be prepared to revise the agreement made in 1927. The Minister should not be too severe on panel practitioners who were trying to give as good a service to panel patients as to their private patients, and were being penalised for doing it. Dissatisfaction by insured persons and by the public generally with the National Health Insurance Act was a real thing, and one of the indications of it was the enormous rise in the number of attendances at voluntary hospitals during the last 12 years. A great proportion of his own patients were dissatisfied with their treatment under the panel doctors, and at the hospital with which he was associated the figures showed that the patients included a large proportion of insured persons. His experience was confirmed by the figures of other hospitals. His own hospital dealt with 50,000 out-patients last year, and he believed a similar number was dealt with at Guy's Hospital. There was no doubt that many of the reasons for the dissatisfaction with the national health insurance system could easily be removed. Lord Hewart had described the Minister of Health as a pure despot; he (Sir E. Graham-Little) invited him to exercise his despotism in rectifying these defects.

ECONOMY AND EFFICIENCY.

Lieut.-Colonel FREMANTLE said it was the desire and the determination of the whole House to maintain the efficiency of the health services within the limits of the exhaustable purse. There was far too great a tendency to think that the real progress of expansion must be in bricks and mortar. In this time of straitened finance the Minister was not necessarily reducing progress if he tried to make the most use of the services which already existed. He asked the Minister what was being done to make use of the voluntary hospitals in the combined scheme under the Local Government Act of 1929? It might be necessary one day to have an official hospital service, but he did not believe it, and he hoped not. At the present time in the interests of the sick poor, and owing to the exhausted purse, he asked the Minister, while it was not too late, to see that officialdom met voluntaryism, and that opportunities were provided for their combination.

THE MINISTER'S REPLY.

Mr. GREENWOOD (Minister of Health), replying to the debate, said that Sir T. Inskip wanted more attention paid to sick visitation. Half the complaints made to-day were to the effect that there was too much. Again, he suggested that there should be greater use of regional medical officers. That also had been one of the complaints. There had been on some sides of the House, perhaps, a little too much emphasis on improper insurance claims. There was not the slightest doubt that there were improper claims. He would gladly sweep all those people out of benefit, but they had to be careful that in tightening their administration they were not denying just claims. Improved administration and greater coöperation between all the agencies concerned were having a very substantial effect. In 1930 the total expenditure of all approved societies on sickness and disablement benefit was £2,000,000 less than in the previous year. It might be that 1930 was a lighter year for sickness,

but he thought part of that saving was undoubtedly due to improved administration and to more effective coöperation between the panel doctors, the regional medical officers, and the approved societies. The improvement of last year had continued during the first half of this year, and the sickness claims for the quarter which had just finished were the lowest for any quarter for several years past; so that the steps that had been taken were now beginning to prove effective.

In reply to Sir E. Graham-Little, he might say that they had not got rid of the free choice of doctor. They had partly limited the rapidity with which an insured person could run from one doctor to another. That had been done in the interests of the medical profession, as well as in the interests of the insured persons, and the Ministry stood by that action. He was satisfied that in the long run it would be found to be in the interests of the medical profession. In connexion with institutional services there was a conflict of opinion between the doctors and the approved societies. There was a reasonable working scheme which, while it did not completely satisfy everybody, was working pretty well.

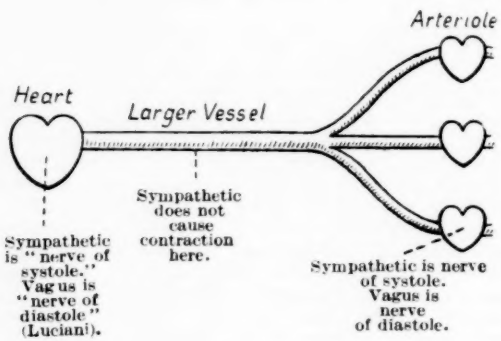
CORRESPONDENCE

VASCULAR PERISTALSIS.

To the Editor of THE LANCET.

SIR,—I was much interested in your reference to my book, "The Hearts of Man," in your annotation (p. 254) on Vascular Peristalsis. The book was read by the late Sir James Mackenzie, to whom I had the honour to be assistant for a number of years. He would neither accept nor reject my findings, but agreed with me that no explanation which entirely satisfied him had been given of the so-called dicrotic waves.

You say in your annotation: "It is difficult to conceive of a peristaltic wave which could travel at


Arteriole
Heart
Larger Vessel
Sympathetic does not cause contraction here.
Sympathetic is "nerve of systole." Vagus is "nerve of diastole" (Luciani).
Sympathetic is nerve of systole. Vagus is nerve of diastole.

the same rate as the pulse, while if it did not do so a pulse tracing should show two different and asynchronous waves." It was my contention that this is exactly what pulse tracings do show. They show (1) the main wave caused by the contraction of the left ventricle, and (2) smaller waves called dicrotic or post-dicrotic, which, I suggested, are really peristaltic waves in the vessel wall and not waves set up by the closure of the aortic valves. I tried to explain myself by reference to the bowel where, when peristalsis is active, the sphincters are open in inhibition and where, when the sphincters are active—i.e., shut—peristalsis is inhibited, and would therefore not be seen in a tracing. The heart was recognised by Gaskell as a sphincter, and is innervated like the other sphincters. The innervation of the larger arteries seems, on the contrary, to be similar to that of the bowel between the sphincters, *until the arterioles are reached*, when a similar innervation to that of the heart is encountered. I visualised these arterioles, therefore, as so many small sphincters or "hearts" acting in unison (synchronously) with the heart itself. The accompanying diagram illustrates the mechanism. These findings were arrived at by a very prolonged study of polygraph tracings, all of which were submitted to Sir James Mackenzie. The work of Luisada, to which you refer, certainly seems to lend support to these ideas.

I am, Sir, yours faithfully,

July 30th, 1931. R. M. WILSON.

TOXIC EFFECTS OF INTRAVENOUS SALYRGAN.

To the Editor of THE LANCET.

SIR,—In his article in your issue of July 18th Dr. C. T. Andrews attributes the symptoms observed by him in one case immediately following the intravenous injection of salyrgan to the toxic effects of the drug. May I venture to suggest that these symptoms were not due to the salyrgan, but to the intravenous injection, per se, in an individual whose cardiovascular system and water-balance were already very much at fault? One experiences symptoms of similar nature occasionally after the administration of almost any kind of intravenous injection. Some years ago, when engaged in studying the effect of isotonic, hypertonic, and hypotonic solution upon the water-balance, I sometimes saw similar effects from small quantities of distilled water. My personal experience with salyrgan dates from its first introduction, and I have never seen any unfavourable results, although I well remember toxic effects, and even death, after novasurol. The symptoms in these cases were those of acute mercurial poisoning. May I mention that I always give salyrgan in its original concentration, without further dilution by distilled water?

I am, Sir, yours faithfully,

Weymouth-street, W., July 30th, 1931. O. B. BODE.

VEHICLES FOR CHEMICAL CONTRACEPTIVES.

To the Editor of THE LANCET.

SIR,—The annotation in your issue of August 1st encourages me to report the progress made since the publication of the article to which you refer. During the last few years, under the auspices of the Birth Control Investigation Committee, I have tested the spermicidal powers of many foaming tablets and cocoa-butter suppositories. I have found foaming tablets the more spermicidal, with both human and guinea-pig sperms. Now many clinical workers consider cocoa-butter suppositories more reliable than foaming tablets. A few insoluble substances (e.g., stearin and paraffin) have been said to be harmful to certain micro-organisms and sperms, if placed in the same dish.[1] This phenomenon, however, will not

[1] Drzewina, A., and Bohn, G.: Compt. rend. de l'Acad. des Sci., 1927, clxxxv., 875.

account for any contraceptive action of cocoa-butter, for sperms are extremely active in glass vessels containing this fat, if suspended in suitable fluids. As is pointed out in your annotation, it must be supposed that the contraceptive action of cocoa-butter is due to its forming a film over the cervix, which acts as a mechanical barrier to sperms. This mechanical barrier, which is not tested in my experiments, may be very important.

There is, however, one great disadvantage in cocoa-butter. I have shown that it hinders the action of chinosol and quinine bisulphate in a remarkable way, so that their effect upon sperms is much reduced. A new fat has now been tried as a vehicle for chinosol. This is a proprietary preparation called cocoala. I find that this fat does not hinder the action of chinosol on sperms. The contraceptive value of insoluble vehicles is now being studied under the Birth Control Investigation Committee. If, as seems likely, cocoala is found to have the same mechanical effect as cocoa-butter, it is obviously preferable. It has the further advantage of being very nearly odourless.

The experiments were carried out by throwing one suppository into 7·5 c.cm. of guinea-pig sperm suspension, maintained at the temperature of the body, and estimating the activity of the sperms after a quarter of an hour. Maximum activity is recorded as 3+, and no movement whatever as 0. The other signs indicate intermediate degrees of activity. No experiment is recorded unless the control sperms show an activity of 3 or 3+. The more effective suppositories were further tested by substituting one-tenth for a whole one. Three or four experiments were performed with each suppository at each concentration. They are arranged below in the order of their spermicidal powers, beginning with the most spermicidal.

—	One suppository to 7·5 c.cm.				One-tenth suppository to 7·5 c.cm.			
Grs. 3 chinosol in cocoala	0	0	0	0	2	2	2	3
Grs. 1½ " " "	0	0	1	1	3	3+	3+	
Grs. 3 " " cocoa-butter ..	1+	3	3	3+		—		
Grs. 5 quinine bisulphate in cocoa-butter	2+	3	3	3		—		

The superiority of cocoala as a vehicle for chinosol is evident.

I may add that a new large foaming tablet called kontrol gives the best results of any yet tested by the guinea-pig sperm technique. Not the slightest movement of a single sperm was seen in six experiments at the concentration of one-tenth of a tablet to 7·5 c.cm.

I am, Sir, yours faithfully,

JOHN R. BAKER.

Department of Zoology and Comparative Anatomy, University Museum, Oxford, August 3rd, 1931.

MORTALITY AFTER PROSTATE OPERATIONS

To the Editor of THE LANCET.

SIR,—Mr. J. Swift Joly, in your issue of July 18th puts very clearly the importance of the pre- and post-operative treatment in relation to prostatectomy, but he also compares general anæsthesia with spinal slightly to the disadvantage of the latter. He says that spinal anæsthesia is ideal from the surgeon's point of view; it gives complete relaxation and makes the operation easier than any other form of anæsthetic. With this I entirely agree, but he adds that it has certain disadvantages to the patient, the most important of these being a fall of blood pressure which increases the risk of reactionary hæmorrhage and seriously diminishes the urinary excretion during the first 24 hours after operation. In my experience these disadvantages need not appear under spinal anæsthesia by the combined method. The 402 consecutive cases of prostatectomy under spinal anæsthesia which I reported in your issue of June 27th were mixed hospital and private cases. The total mortality was just under 5 per cent., and if the purely accidental deaths, in which the cause of death had no relation whatever to hæmorrhage, diminished urinary secretion or uræmia from infection be excluded, the mortality is just under 4 per cent. The following is the technique I use for this combined form of anæsthesia:—

Nitrous oxide and oxygen, A.C.E. and oxygen, or ether and oxygen is given, the drug being chosen according to the particular case. The anæsthesia is carried to unconsciousness, not surgical anæsthesia. An intrathecal injection is then given in the second lumbar space of either 0·02 g. of stovaine or 0·04 g. of novocaine in normal saline. The finest needle now in use must be used or the dose will not be sufficient. Relaxation of the lower abdominal wall will be obtained. The operating table must be kept in a slight slope, head downwards, all the time. When the patient is moved from the theatre this slight slope should be maintained on the trolley, and he should be placed in bed with blocks already under the foot of the bed. When the patient is back in bed the blood pressure will be found to be approximately the same as before the operation, and there will be no increased risk of reactionary hæmorrhage or diminished urinary secretion. I am authorised by Mr. Sydney Macdonald to say that "in employing spinal anæsthesia in accordance with the above technique there is less hæmorrhage at the time of operating, as with the relaxation obtained one is less liable to get outside the proper line of cleavage, less reactionary hæmorrhage, no shock, and less interference with urinary secretion afterwards."

Quite lately I had to anæsthetise two big men, both very fat, aged 75 and 78, respectively. The physicians in charge of these cases vetoed any form of inhalation anæsthesia because of the extreme amount of emphysema and chronic bronchitis present. The first case was given 0·035 g. stovaine by the fine needle; the second was given 0·04 g. by a slightly larger needle. Both made uninterrupted recoveries.

I am, Sir, yours faithfully,

H. M. PAGE.

Blandford-street, W., August 4th, 1931.

A BARNSLEY CONVALESCENT WARD.—Lady Sutherland last week opened a convalescent ward at the Beckett Hospital, Barnsley, which has cost about £600, and is the gift of the Wharncliffe Woodmoor Colliery owners and workmen.

NORTH DEVON INFIRMARY.—Last year this Barnstaple Hospital (72 beds) received 824 in-patients, who stayed on an average 21 days, and cost an average of £7 4*s*. 3*d*. each. Of the 1423 out-patients 544 were accident and emergency cases.

WAKING OF PATIENTS IN HOSPITAL.—The Minister of Health has issued a memorandum to all county and county borough councils drawing attention to the report on patients' waking hours in London voluntary hospitals, published by King Edward's Hospital Fund for London, and suggesting that the councils will no doubt wish to consider the question of adopting the recommendations in the administration of their own hospitals.

PARLIAMENTARY INTELLIGENCE

NOTES ON CURRENT TOPICS.

SAFETY IN MINES.

ON July 27th the House of Commons went into Committee of Supply on the Civil Estimates.

On a vote of £175,521 for the salaries and expenses of the Mines Department of the Board of Trade,

Mr. DUNCAN MILLAR referred to the question of safety in mines. He said that the Secretary for Mines informed the House last December that the accident-rate per 1000 persons employed above and below ground had increased from 158·85 in 1924 to 181·39 in 1929, and that in the same period the mortality-rate had risen from 0·90 to 1·11. The report for 1930 had not been laid before the House, and he would like to know if there was any improvement in the figures.

Mr. SHINWELL (Secretary for Mines), replying to the debate, said that pithead baths were being provided by the Miners' Welfare Committee as rapidly as possible. Fifty-nine baths had been erected since September, 1928, 40 were in course of construction, and the new programme aimed at three per month. As to the question of safety, there had been conferences, and in Yorkshire education committees had assisted boys at continuation classes in connexion with the mining industry to undertake educational work on the safety of mines. There had been joint committees of the Miners' Federation and Mining Association dealing with safety, and in many other ways they were doing what they could to promote safety. In regard to suggestions which had been made that coalowners were preventing the use of safety appliances which entailed further expenditure, Mr. Shinwell said, in fairness to the owners, he was bound to say that he had found very little difficulty in inducing them to consider safety devices.

The vote was agreed to.

HOME OFFICE ADMINISTRATION.

On July 28th the House of Commons again went into Committee of Supply on the Civil Estimates.

MENTAL DEFECTIVES AND PRISON.

On a vote of £298,434 for the salaries and expenses of the Home Office,

Mr. G. LOCKER-LAMPSON said he thought the Home Secretary could do a great deal of good by communicating with the magistrates in the case of mental defectives. There was a practice in some courts of sending persons of doubtful mentality to prison in order to undergo observation. But the practice of magistrates in this matter differed considerably. Some magistrates took advantage of their powers under the Mental Deficiency Act while others did not, but sent mental defectives to prison. It was very undesirable that mental defectives should be branded as convicted felons, and it was very undesirable that prisoners of normal mentality should be kept in the same prison as mental defectives. Mental defectives ought to be sent at once to a special institution, but owing to the delay in transferring them their sentences often expired before institutional accommodation was found for them, and thus they were thrown once more upon the world to commit further wrongs against the community. The Home Secretary would be doing a great service if some arrangement could be made whereby accommodation could be found much more speedily for this type of case.

Mr. CLYNES (Home Secretary) said that, with regard to mental defectives, as soon as a prisoner was found certifiable the case was notified to the Board of Control, who communicated with the local authority and arranged as soon as possible for the transfer of those prisoners to an institution for mental defectives. Considerable numbers of prisoners though not certifiable were recognised by the medical officers as being of subnormal intelligence or with a defective sense of responsibility. The treatment of those persons in prison was a matter to which the most careful consideration had been given. Those who were serving sentences of any length were transferred to certain selected prisons for special arrangement to be made for their treatment and occupation. In all cases special care was taken not to subject them to undue discipline.

FACTORY INSPECTION.

Lord EUSTACE PERCY said that the present Home Secretary had increased the number of factory inspectors as an experiment. He had increased the number of Class I. inspectors by nine and Class II. inspectors by five, and had made one or two small variations in other directions; but no one supposed that those increases were sufficient to render Home Office inspection of factories what it ought to be, nor in his judgment could any conceivable increase in the number of inspectors really make this service as efficient as it ought to be. In many industries they might get more rapid advance and more easy adaptation to the new discoveries of science if they delegated more responsibility from the Home Office to industry and made it answerable for the maintenance of a high standard of safety, health, prevention of industrial diseases, and so on. Until that system was carried very much further they would never have enough officials or enough inspectors to keep track of all the small workshops and factories where abuses in the matter of safety regulations most commonly occurred.

Mr. CLYNES said that, on the question of factory inspection, he was in complete agreement with the general argument used by Lord E. Percy. He particularly welcomed that argument, because the Home Office had for some time been following precisely those broad lines of adapting factory inspection to the changed industrial conditions which had been enormously altered by big amalgamations and because of the immense factories and workshops that had taken the place of smaller institutions. Adequate precautions, conditions of safety, the setting up of elaborate welfare organisations within the works—all these things tended to alter the service of factory inspectors in these days, and to make it unnecessary for them to do the things which they had to do 50 or 60 years ago. But there was still very much good work for the inspectors to do, and he welcomed the terms in which Lord E. Percy had described that work. The Government were endeavouring to follow not only on the lines of what Lord E. Percy had said, but to make a substantial increase in the number of inspectors. The number had been increased from 205 in 1929 to 282 at the present time.

After further debate the vote was agreed to.

THE SUMMER ADJOURNMENT.

Both Houses of Parliament adjourned on July 31st for the summer recess. They will reassemble on Oct. 20th. The Royal Assent was given to the Bethlem Hospital (Amendment) Bill and the Housing (Rural Authorities) Bill.

HOUSE OF COMMONS.

WEDNESDAY, JULY 29TH.

Ventilation of the House of Commons.

Mr. STRAUSS asked the First Commissioner of Works whether he intended to take any action in connexion with the ventilation of the House before the winter session, in view of the representations made to him by Members of all parties and particularly by the medical Members of the House.—Mr. LANSBURY replied: In view of the representations which have been made, I propose to call for a joint report from the Government Chemist and the Department of Scientific and Industrial Research on the air and general ventilation conditions throughout the whole of the

House of Commons. The question of the remedial measures, if any, to be adopted will have to be considered in the light of the report when received.

Mr. MACQUISTEN: In view of the representations which have been made on the question by the medical Members of the House, and in view of the uncomfortable nature of the benches, will the right hon. gentleman call in some osteopaths?

Mr. LANSBURY: I have no faith in experts.

Murder in Scotland.

Dr. HASTINGS asked the Secretary of State for Scotland how many persons were proceeded against for murder in Scotland during each of the years 1920 to 1929; how many of such persons were convicted of murder; how many of these were executed and how many were found guilty but insane; and how many proceeded against for murder were found guilty of some lesser offence.—Mr. ADAMSON replied: The following table gives the information desired:—

A=Number of persons proceeded against for murder *whose cases were disposed of within the year*—i.e., all persons apprehended whose cases were disposed of within the year, including those discharged without being called for trial, but excluding persons charged with murder and found guilty of some lesser offence.
B=Number of persons convicted of murder.
C=Number of persons convicted of murder and executed.
D=Number of persons proceeded against for murder and ordered to be detained during H.M. pleasure on being found (*a*) to have committed the act charged but to be not guilty on the ground of insanity at the time; or (*b*) insane and unfit to plead at time of trial.
E=Number of persons proceeded against for murder and found guilty of some lesser offence.

Year.	A.	B.	C.	D. Insane.		E.
				At time.	In Bar.	
1920 ..	13	2	2	—	2	6
1921 ..	47*	—	—	—	2	5
1922 ..	17	2	1	1	—	7
1923 ..	10	3	3	—	2	3
1924 ..	9	1	—	—	4	3
1925 ..	12	1	1	1	3	3
1926 ..	5	—	—	—	1	5
1927 ..	14	1	1†	—	5	4
1928 ..	14	3	2	1	5	2
1929 ..	9	1	—	1	4	2

* 40 of these were apprehended in connexion with the murder of one man.
† The execution took place in January, 1928.

Advisory Committees on Rural Housing.

Sir KINGSLEY WOOD asked the Minister of Health if he could announce the composition of the advisory committee under the Housing (Rural Authorities) Bill.—Mr. GREENWOOD replied: The composition of the committee will be as follows: Sir Tudor Walters (chairman); Sir George Barstow; Mr. E. W. Cemlyn-Jones; Sir Theodore Chambers; Mr. R. Coppock; Sir Valentine Crittall; Mr. E. G. Gooch; Mrs. Peter Hughes-Griffiths; Mr. Alan Rae Smith; Sir J. Walker Smith; and Sir Seymour Williams.

Replying to Mr. SULLIVAN, Mr. Adamson (Secretary of State for Scotland) said: The names of the persons whom it is proposed to appoint as members of the Scottish Advisory Committee were as follows: Sir William E. Whyte (chairman); Provost A. M. MacEwen; Mr. Alexander Robb; Mr. James C. Cossford; Miss Bella Jobson; Mr. John Train, M.P.; and Mr. Adam McKinlay, M.P.

Diagnosis of Cancer.

Sir NICHOLAS GRATTAN-DOYLE asked the Minister of Health whether he was aware of recent successful attempts at the diagnosis of cancer by means of blood tests; and whether any special financial assistance was being given by his department to further this particular line of research under hospital conditions in Great Britain.—Mr. GREENWOOD replied: I assume that the hon. Member has in mind the investigations which are being undertaken by Dr. Bendien in Holland. This matter will receive the attention of the Departmental Committee on Cancer, and any recommendations of that committee as to the desirability of further investigations will receive my careful consideration.

THURSDAY, JULY 30TH.

Diagnosis of Cancer.

Dr. MORRIS-JONES asked the Minister of Health whether his attention had been called to the recent investigations of Dr. Bendien, of Holland, into the possibility, by means of blood tests, of making the diagnosis of cancer in its early stages certain; and whether he would secure a report from the Medical Research Council upon this method.—Mr. GREENWOOD replied: My attention has been drawn to this matter and, in common with all other investigations with regard to this disease which come to notice, it will be considered by the Departmental Committee on Cancer on which the Medical Research Council is represented.

Dr. MORRIS-JONES: Is the right hon. gentleman satisfied that his department gives sufficient support and encouragement to the investigators of the highest eminence in their work?

Mr. GREENWOOD: I shall be glad if the hon. gentleman will give me information in regard to any cases where it does not.

Mr. HANNON: Is the right hon. gentleman aware that Dr. Bendien is in London, and will his advisers get into communication with that distinguished gentleman?

Mr. GREENWOOD: If he will make representations I have no doubt that will be arranged.

Reports of Medical Officers of Health.

Lieut.-Colonel FREMANTLE asked the Minister of Health if he could arrange that the annual reports of medical officers of health, giving the vital statistics for the year under review, should always give also the corresponding figures for the previous year and for the previous decades for which the figures were available.—Mr. GREENWOOD replied: It is open to a medical officer of health to include in his annual report any information which he considers it desirable to give. I do not, however, consider it necessary to require medical officers of health to include in their annual reports comparative figures on the lines suggested by the hon. and gallant Member, as a comparison year by year of the vital statistics for any administrative area can readily be obtained from an examination of the annual reports of the medical officer of health for that area or from the Statistical Review issued annually by the Registrar-General.

Lieut.-Colonel FREMANTLE: Does not the Minister recognise that the whole value of statistics is that they should be comparative in order to show whether there is progress, and that therefore it is essential to have the previous figures?

Mr. GREENWOOD: The hon. Member said last night that we must have economy in social services, and this is one of the economies that can be undertaken.

Lieut.-Colonel FREMANTLE: There will be no lack of economy in carrying out the suggestion.

Lieut.-Colonel FREMANTLE asked the Minister of Health why Circular 1296, as to the contents of the annual reports of medical officers of health, did not ask for any report as to venereal diseases or vaccination under the vaccination laws; and whether he would take steps to include these matters to be dealt with in future.—Mr. GREENWOOD replied: As regards venereal diseases, annual returns of the work done at the treatment centres are already furnished to my department by the medical officers in charge of the centres, but I will consider whether in future medical officers of health should be requested to deal specially with this subject in their annual reports. As regards vaccination, this work has only recently been transferred to the local authorities, and the question whether medical officers of health should be asked to deal in future with this subject in their annual reports will be considered.

Housing Statistics.

Lieut.-Colonel FREMANTLE asked the Minister of Health if he would arrange for an annual return to be published on the subject of housing, detailing in each local government area the number of houses in occupation, the number of new houses erected during the year under the several Housing Acts, the number of houses reconditioned under the Housing (Rural Workers) Act, 1926, and the number of houses included and dealt with during the year in clearance and improvement areas under the 1930 Act, in addition to the number of houses dealt with, as commonly reported in the reports of medical officers of health.—Mr. GREENWOOD replied: While I agree that such a return as the hon. and gallant Member suggests would offer certain advantages if it could be issued very shortly after the close of the period to which it relates, I fear that it would not be practicable to secure that early issue, and in these circumstances I do not think the value of the return would be a reasonable compensation for the expenditure of the time, labour, and money involved.

Lieut.-Colonel FREMANTLE: Will the right hon. gentleman consider some way of amalgamating the innumerable statements and returns which are compiled?

Mr. GREENWOOD: I will certainly consider that.

Treatment by Insurance Practitioners.

Lieut.-Commander KENWORTHY asked the Minister of Health if he would state the regulations whereby panel doctors were forbidden to give certain medical treatment

to panel patients which would be given to private paying patients and which treatments were in general use in private medical practice; and what were the reasons for this prohibition.—Mr. GREENWOOD replied: I am not aware of any such regulations as my hon. friend mentions. Insurance practitioners are required in all ordinary cases to give to their patients all proper and necessary medical services other than those involving the application of such special skill and experience as is not to be expected of general practitioners as a class, and to order or supply such drugs and prescribed appliances as are requisite for the treatment of any patient.

Health Insurance Benefit and Rheumatic Diseases.

Mr. GRAHAM WHITE asked the Minister of Health the approximate amount of national health benefit paid in any recent years in respect of sickness arising from rheumatic diseases.—Mr. GREENWOOD replied: The information desired by the hon. Member is not available and could only be obtained as the result of a special investigation and return by every one of about 7000 approved societies and branches. It has, however, been estimated on good authority that one-seventh of the total invalidity amongst insured persons is due to rheumatic diseases, and on this basis the cost involved for the year 1930 would have been about £2,500,000.

Cost of Dental Benefit.

Mr. THOMAS LEWIS asked the Minister of Health if he would lay upon the Table a statement of the expenditure of the Regional Dental Service and the Dental Benefit Council, showing the cost of establishing the organisation, the number of cases dealt with, and the running expenses.—Mr. GREENWOOD replied: I will bring my hon. friend's request to the notice of the Dental Benefit Council.

Patent Rights of a Dental Process.

Mr. BUCHANAN asked the Minister of Health his reason for refusing to accept the offer of Dr. Watson, of 2, Third-avenue, King's Park, Glasgow, to give his department the patent rights of a process for extracting, disinfecting, and replanting teeth, and a machine for the purpose of boring and tapping teeth; and whether he was aware that America had accepted the patent rights.—Mr. GREENWOOD replied: I have not considered it desirable to take advantage of Dr. Watson's offer because, as has been explained to him on several occasions, his proper course is to follow the customary practice of making full scientific publication of his methods and results, with a view to trial and criticism by his professional colleagues. I have no information on the second part of the question.

FRIDAY, JULY 31ST.

Telephone Instruments and Hygienic Precautions.

Mr. WOMERSLEY asked the Postmaster-General whether he was aware that the new type of hand microphone instrument, for which an extra rental was charged, could not be taken to pieces for cleaning, and if he would take action to enable cleaning to be done to avoid unhygienic conditions that might otherwise arise.—Mr. VIANT (Assistant Postmaster-General) replied: It is not necessary to take a telephone instrument to pieces in order to maintain it in a hygienic condition. Dismantling is very liable to damage the delicate parts of the instrument, and it is undesirable to facilitate such action.

MEDICAL NEWS

University of Cambridge.

On July 28th the following degrees were conferred:—

M.D.—*R. W. B. Ellis, * J. E. D. Crozier, E. E. Llewellyn, A. E. Naish, W. D. Newcombe, and A. W. Spence.

M.B.—R. H. B. Snow.

B. Chir.—H. S. Buckland, W. A. Fell, C. R. T. Lane, *E. H. W. Lyle, R. G. Orr, P. G. Scott, H. C. Stewart, and J. W. Summerbayes.

* By proxy.

Royal College of Physicians of London.

At a meeting of the College on July 30th with Lord Dawson, the President, in the chair, the following Fellows of the College were elected officers for the ensuing year:—

Censors: Dr. James Collier, Dr. W. Langdon Brown, Dr. C. R. Box, and Sir Charlton Briscoe. *Treasurer:* Dr. S. P. Phillips. *Registrar:* Dr. Raymond Crawfurd. *Harveian Librarian:* Dr. T. H. Arnold Chaplin. *Assistant Registrar:* Dr. Robert Oswald Moon. *Library Committee:* Dr. H. R. Spencer, Dr. C. J. Singer, Dr. Anthony Feiling, and Dr. J. D. Rolleston. *Curators of the Museum:* Dr. H. R. Spencer, Dr. Hugh Thursfield, Dr. S. E. Dore, and Dr. Harold Gardiner-Hill. *Finance Committee:* Dr. Robert Hutchison, Sir Percival Horton-Smith-Hartley, and Dr. L. S. T. Burrell.

The following were elected Examiners:

Chemistry: Mr. H. W. Cremer and Mr. W. B. Tuck, D.Sc. *Physics:* Mr. D. Orson Wood and Mr. F. L. Hopwood, D.Sc. *Practical Pharmacy:* Prof. J. A. Gunn, Dr. W. E. Dixon, Dr. Philip Hamill, Dr. Newman Neild, and Dr. Orlando Inchley. *Physiology:* Prof. Joseph Barcroft, F.R.S., and Prof. R. J. S. McDowall. *Anatomy:* Prof. Duncan Blair. *Pathology:* Dr. C. E. Lakin, Dr. George Graham, Prof. Matthew Stewart, and Dr. H. W. C. Vines. *Medical Anatomy and Principles and Practice of Medicine:* Sir Thomas Horder, Dr. A. E. Russell, Dr. Cecil Wall, Dr. David Forsyth, Dr. E. A. Cockayne, Dr. Reginald Miller, Dr. E. P. Poulton, Dr. Albert Ramsbottom, Dr. A. C. D. Firth, Dr. E. Bellingham Smith, Dr. L. S. T. Burrell, and Dr. Ivor J. Davies. *Midwifery and Diseases Peculiar to Women:* Mr. J. P. Hedley, Mr. J. B. Banister, Mr. D. W. Roy, Prof. Daniel Dougal, and Mr. A. C. Palmer. *Public Health:* (Part I.) Dr. G. Roche Lynch. (Part II.) Dr. G. F. Buchan. *Tropical Medicine:* Dr. J. A. Arkwright, F.R.S., and Dr. N. Hamilton Fairley. *Ophthalmic Medicine and Surgery:* Dr. T. Grainger Stewart. *Psychological Medicine:* (Part I.) Dr. Edward Mapother. (Part II.) Dr. J. G. Porter Phillips, and Dr. S. A. K. Wilson. *Gynæcology and Obstetrics:* Prof. J. M. Munro Kerr. *Laryngology and Otology:* Mr. Lionel Colledge. *Murchison Scholarship* (1932): Dr. Theodore Thompson and Dr. O. L. V. de Wesselow.

The following Fellows were elected members of the Advisory Committee to the President:—Dr. H. Morley Fletcher, Dr. Robert Hutchison, Dr. A. M. H. Gray, Dr. H. L. Tidy, Dr. H. H. Dale, Dr. J. A. Ryle, and Dr. T. Watts Eden.—Dr. James Collier and Dr. W. Langdon Brown were appointed to represent the College on the Mackenzie-Mackinnon trust committee, and Sir Humphry Rolleston was re-elected representative on the executive committee of the Imperial Cancer Research Fund.—The President, Lord Dawson, will represent the College at the celebration of the 250th anniversary of the Royal College of Physicians of Edinburgh.

The President announced that he had appointed Sir George Newman to be Harveian Orator and Dr. Dugald Baird to give the Bradshaw lecture, both in 1932. (The forthcoming Harveian oration in October next will be delivered by Dr. Robert Hutchison).—In addition to the appointments to Lectureships announced at the last meeting, Miss Harriette Chick, D.Sc., was appointed Oliver-Sharpey lecturer and Dr. L. P. Jacks the Lloyd Roberts lecturer for 1932.

The Baly medal, awarded every alternate year to the person who shall be deemed to have most distinguished himself in the science of physiology during the two years immediately preceding the award, was awarded to Prof. W. B. Cannon of Harvard University. The President also announced the award in Edinburgh of the Murchison scholarship jointly to W. M. Arnott and R. J. Kellar.

The following candidates, having satisfied the Censors' Board, were admitted Members of the College:

Wilbert Hurst Brown, M.B.Oxf., Ernest Thomas Conybeare, M.B.Lond., Edward Philip Nagle Creagh, M.B., N.U.I., Hugh Crichton-Miller, M.D.Edin., Ratansha Dinsha Dalal, L.R.C.P., Courtenay Nisbet Evans, M.B.Lond., Joseph Hayes Fairweather, M.D.Edin., Mohamed Gamil Farid, M.B.Cairo, Theophil Johannes Friedrich Frank, M.D.Melb., Clifford Allchin Gill, L.R.C.P., Thomas Howard Gillison, M.B.Edin., John Howell Halliday, M.B.Sydney, Henry Procter Hutchinson, M.B.Camb., Harold Gordon McGregor, M.B.Lond., Robert Michael Maher, M.D.Lond., John Onbridge Mercer, M.B.N.Z., Herbert Leslie Milles, L.R.C.P., Wilfrid George Oakley, M.B.Camb., Rupert Samuel Bruce Pearson, M.B.Oxf., Evelyn Nora Popper, M.D.Lond., Mostyn Levi Powell, M.B.Melb., Gangandrum Venkataswami Ram Mohan, M.B.Madras, Douglas Riding, M.D.Liverp., William Carey Smallwood, M.B.Birm., Tej Raj Swarup, M.B.Lucknow, L.R.C.P., Abd El Kader Talkhan, M.B. Cairo, Alfred Brian Taylor, M.B.Birm., Geoffrey Fawsitt Taylor, L.R.C.P., Thomas Tennent, M.D.Glasg., Hugh Ferguson Watson, M.D.Glasg., Charles Edward Walton Wheaton, M.D.Lond., and Bertram Alan Young, M.D.Lond.

Diplomas of L.R.C.P. were conferred upon 140 candidates (120 men and 20 women) who have passed the Final Examination of the Conjoint Board and complied with the by-laws of the College. The following are the names and medical schools of the successful candidates:—

A. M. M. Ali, Bombay and Middlesex; E. Anthony, London; Grace M. Archer, Westminster; H. G. E. Arthure, Charing Cross; Doris Ascough, Manchester; P. T. Ashby, Camb. and London; E. S. Asiedu-Ofei, Birmingham; E. J. Baldwin, Oxford and St. Thomas's; A. V. Baliga, Bombay and King's Coll.; K. Baxter, Manchester; R. A. Beazer, Oxford and St. Thomas's; W. D. Bell, Camb. and St. Bart.'s; W. H. Bradbeer, Guy's; R. J. B. Broad, Middlesex; G. O. Brooks, Camb. and St. Mary's; J. M. L. Burtenshaw, Oxford and Guy's; C. R. Caffry, Dublin and London; Beatrice L. Campion, Royal Free; A. M. Cantor, Guy's; P. Chandra, Punjab and Cambridge; E. F. Claridge, London; Barbara G. C. Clarke,

R. C. Cohen, and C. P. Collins, Univ. Coll.; J. G. Connell, Camb. and Sheffield; H. A. Constable, Guy's; A. B Cook, St. Bart.'s; E. J. Currant, Camb. and London; D. Davidson, Univ. Coll.; V. S. H. Davies, M.B. Liverpool; J. R. Duffield, Camb. and Westminster; S. Durham, Oxford and London; K. V. Earle, Camb. and St. Thomas's; G. G. M. Edelsten, Oxford and St. Bart.'s; G. R. Ellis, Camb. and Liverpool; E. St. J. C. Emerson, St. Mary's; L. S. Everett, Camb. and King's Coll; P. B. Fernando, L.M.S. Ceylon, Univ. Coll.; G. A. Fleet, M.D. McGill; M. J. Garber, Guy's; H. N. Garrus, Camb. and Guy's; V. Glass, Univ. Coll.; S. Goide, Charing Cross; C. E. D. H. Goodhart, Camb. and St. Bart.'s; G. H. Gool, Guy's; W. H. Greany, Oxford and Guy's; H. F. Green, Camb. and St. Bart.'s; A. Greenberg, St. Bart.'s; H. J. Griffiths, Middlesex; Hilary S. M. Hadaway, Royal Free; Winifred S. Hall, Univ. Coll.; H. A. R. Hamilton, St. Thomas's; D. C. Harris, Middlesex; A. E. T. Hart, Camb. and St. Thomas's; E. S. Harverson, Univ. Coll.; J. R. Heming, St. Thomas's; E. Hinden, Camb. and St. George's; L. C. Holland, Bristol; J. H. Hughes, M.B. Liverpool; Blaguigna Illitch, Royal Free; N. M. James, Camb. and King's Coll.; J. E. Jenkyn-Thomas, Camb. and St. Bart.'s; W. P. Jenson, Camb. and Westminster; D. Johnson, Bristol and King's Coll.; Annie L. Jones, Univ. Coll.; Esther P. W. Jones, Cardiff and Charing Cross; Alice M. Kaye, King's Coll.; C. A. Keane, St. Bart.'s; Mary L. R. Kennard, and S. J. Knight, St. Mary's; M. Kosloff, Guy's; N. L. Lamb, Cardiff and Guy's; J. S. Lane, L.M.S.S.A. Camb. and Guy's; P. R. K. Lane, Birmingham; A. M. P. Laurent, Univ. Coll.; H. G. Letcher, M.B. Adelaide; T. M. A. Lewis; Cardiff and London; H. L. Lightstone, Middlesex; M. A. Lloyd, St. Bart.'s; J. W. McLaren, Camb. and St. Thomas's; J. W. Macmillan, Camb. and St. Thomas's; G. A. M. Madel, Middlesex; J. W. Meanley, Sheffield and Leeds; E. K. K. Menon, Birmingham; A. K. Monro, Camb. and London; P. B. Moroney, M.B., Liverpool; W. J. Morris, Liverpool; I. Moshinsky, Guy's; H. C. Muirhead, Guy's; R. W. C. Murray, Camb. and Birmingham; T. F. B. Noble, London; L. G. Norman, Univ. Coll.; Catherine O'Connor, Manchester; Angela M. S. A. Ofenheim, King's Coll.; Lily M. O'Hanlon, King's Coll.; G. F. Petty, St. Bart.'s; A. L. Potter, M.B. Liverpool; Eluned M. Puleston-Jones, Royal Free; J. Rabinovitch, Leeds; G. F. Rees-Jones, Univ. Coll; D. Y. Richardson, Durham; J. C. Roberts, and H. D. Robertson, St. Bart.'s; C. H. Rogerson, Guy's; N. L. Rusby, Oxford and St. Thomas's; P. C. Sanyal, M.B. Calcutta, Middlesex; M. N. Sardena, M.B. Punjab, T. Schrire, M.B. Cape Town; E. Sharpe, Camb. and Guy's; E. W. H. Shawcross, Camb. and King's Coll.; M. H. Sherwell, M.B. Birmingham; Rosalie Shoenberg, Royal Free; A. B. Simmons, King's Coll.; H. Simmons, St. Bart.'s; H. Singh, M.B. Punjab, St. Bart.'s; J. C. Smith, M.B. Manchester; D. G. Snell, St. Thomas's; R. G. W. Southern, St. Thomas's; Gladys M. G. Spencer, Camb. and King's Coll.; Violet Spiller, M.D. Geneva, Royal Free; A. A. Sreenivasan, Bombay and Charing Cross; T. Standring, King's Coll.; C. Starkie, Manchester; V. Swaminathan, Bombay and Manchester; R. A. Sykes, Camb. and St. Bart.'s; A. K. Talkhan, M.B. Cairo, G. Tattersall, Manchester and Univ. Coll.; Winifred P. Thomas, Univ. Coll.; W. F. Townsend-Coles, London; J. G. Vincent-Smith, Camb. and St. George's; A. B. Water, Camb. and St. Bart.'s; J. H. Way, Leeds and Middlesex; G. Wells, St. Bart's; M. Westwood, Camb. and St. Bart.'s; S. O. Widman, St. Thomas's; E. W. M. Williams, Cardiff; Dorothy Woodman, Royal Free; S. L. Wright, Univ. Coll.; A. H. Zair, Camb. and Birmingham; J. Zeitlin, London.

The undermentioned diplomas were conferred jointly with the Royal College of Surgeons upon the following candidates:—

D.T.M. & H.—E. S. Adderley, B. P. Baliga, C. J. H. Brink, W. A. Burnett, R. Caldera, H. P. Chaudhuri, H. D. Cronyn, B. R. Das, C. H. Howat, A. J. Johnson, F. B. Khambatta, R. K. Khanna, P. B. Lee Potter, H. W. H. McClelland, S. H. Moore, Ethel Morris, J. L. Razdan, J. A. Rosset, V. Sivalingham, M. M. Syddiq, J. Taylor, P. G. G. Unnithan, L. A. F. Wiles, A. W. Williams, W. E. S. Winn.

D.O.M.S.—M. Basheer, G. H. B. Black, M. G. J. Booysen, G. A. Brew, Eleanor M. P. Brock, C. Budeiri, A. Campbell, M. Franks, A. W. Green, E. G. Kennedy, Edith G. Limmex, S. Macky, K. C. S. Menon, Catherine E. Orr-Ewing, B. W. Roffey, K. Saha, R. Sampson, M. N. Sardana, R. C. Tarapore, H. L. St. V. Welch.

D.P.H.—L. W. Cann, Irene E. Chandler, Anne A. Craig, J. Crawford, M. B. Daver, T. W. Davies, D. M. de Silva, D. Diamond, C. E. Dolman, M. J. Evans, T. I. Evans, Sarah P. M. Griffiths, C Hill, Kathleen M. Horton, J. E. Haward, Amy L. Jagger, A. B. Kettle, Catherine B. McArthur, Hilda K. McKernan, J. Portelly, J. F. Southward, T. W. Stallybrass, R. Stuart, R. J. Toleman, Olga F. Tregelles, E. W. Vaughan, Nora W. Wamsley.

D.P.M.—G. J. Bell, L. J. Bendit, A. Cannon, C. R. Cooke-Taylor, J. A. F. Denyssen, S. B. Hall, J. G. Hamilton, S. D. Isaacs, J. M. Loftus, Joyce McConnell, G. W. Murray, C. J. Thomas, L. M. Webber.

D.L.O.—G. E. Archer, M. G. J. Booysen, E. E. L. Burnier G. V. Joglekar, B. V. P. Reddy.

Royal College of Surgeons of England.

An ordinary meeting of the Council was held on July 30th with Mr. R. P. Rowlands, vice-president, in the chair.

Diplomas of Membership were granted to the candidates whose names appear elsewhere as new licentiates of the Royal College of Physicians. Diplomas in Tropical Medicine and Hygiene and in Ophthalmic Medicine and Surgery were also granted jointly with the College of Physicians.

On the nomination of the Canadian Medical Association, Dr. J. C. B. Grant, professor of anatomy, and Mr. C. H. Best, professor of physiology, were appointed assessors for the Primary Examination for the Fellowship to be held in Toronto next October.

University of London.

At recent examinations the following candidates were successful:—

M.D.

Branch I. (Medicine).—Ilahi Bakhsh, and Philip Berry, Guy's Hosp.; Alexander Cohen, London Hosp.; Dorothy Collishaw, London (R.F.H.) Sch. of Med. for Women; G. I. Davies, Univ. Coll. Hosp.; R. P. P. Davies, St. George's Hosp.; Archibald Gilpin, King's Coll. Hosp.; M. L. Mistri, Guy's Hosp.; Mary E. Pease, Univ. Coll. Hosp.; G. C. Pether, Middlesex Hosp.; David Preiskel, St. Bart.'s Hosp.; J. H. Simmons, and G. E. F. Sutton, King's Coll. Hosp.; C. E. W. Wheaton, St. Thomas's Hosp.; E. A. Wood, and B. A. Young, Univ. Coll. Hosp.

Branch II (Pathology).—J. N. Cumings, King's Coll. Hosp.

Branch III. (Psychological Medicine).—F. E. E. Schneider, Univ. Coll. Hosp.

Branch IV. (Midwifery and Diseases of Women).—Harriet E. Acheson, London (R.F.H.) Sch. of Med. for Women; D. A. Blount, St. Bart.'s Hosp.; Bridget S. P. Gurney, and M. R. Jones, London (R.F.H.) Sch. of Med. for Women; Joyce Morgan, Westminster Hosp.; K. I. Parkes, King's Coll. Hosp.; and T. B. Pearce, St. Thomas's Hosp.

Branch VI. (Tropical Medicine).—R. V. Bowles, Univ. Coll. Hosp.; and G. P. Patel, Grant Med. Coll. Bombay, and London (R.F.H.) Sch. of Med. for Women.

M.S.

Branch I. (Surgery).—Mark Coleman and R. S. Pilcher both of Univ. Coll. Hosp.

Branch IV. (Laryngology, Otology, and Rhinology).—A. G. Tresidder, London Hosp.

Forthcoming Lectures.—Three lectures on the Production, Distribution, and Value of Milk will be given by Prof. R. Stenhouse Williams, M.D., at the London School of Economics on Wednesdays, Oct. 14th, 21st, and 28th at 5 P.M.—Prof. K. Bühler, who occupies the chair of psychology in the University of Vienna, will give three lectures on the Theory of Language and the Psychology of Speech, at University College on dates in October to be announced later.—The Semon lecture will this year be delivered by Mr. Douglas Harmer, F.R.C.S., on Thursday, Nov. 5th, at 5 P.M., in the rooms of the Royal Society of Medicine, Wimpole-street, W. His subject will be the Relative Value of Radiotherapy in the Treatment of Cancer in the Upper Air Passages.

The *William Julius Mickle Fellowship*, of the value of at least £200, is offered to the graduate who has, in the opinion of the Senate, done most to advance medical art or science within the preceding five years. Applications must be made before Oct. 1st, and particulars are obtainable from the Academic Registrar.

Society of Apothecaries of London.

At recent examinations the following candidates were successful:—

Surgery.—K. W. Bruce, Univ. of Durham; G. B. Carter, Univ. of Manchester; M. Ditton, Univ. of Heidelberg and Royal Free Hosp.; A. A. Grace, St. Bart.'s Hosp.; B. N. Halder, Univ. of Durham; R. Schauder, King's Coll. Hosp.; and C. F. Williamson, Univ. of Birmingham.

Medicine.—H. W. Davies, St. Mary's Hosp.; G. R. Germany, Univ. of Sheffield; A. R. Madden, St. Mary's Hosp.; O. L. Matthews, Univ. Coll. Hosp.; and M. R. Tuteur-Samuel, Universities of Frieburg and Manchester.

Forensic Medicine.—O. A. P. Clark, Westminster Hosp.; R. R. Clipstein, St. Mary's Hosp.; G. Handelsman, Univ. of Witwatersrand and London Hosp.; O. L. Matthews, Univ. Coll. Hosp.; C. Morgan, Charing Cross Hosp.; M. S. Mules, Royal Free Hosp.; and Grantley Smith, Univ. of Bristol and Guy's Hosp.

Midwifery.—G. B. Carter, Univ. of Manchester; Sidney Smith, Univ. of Manchester; and V. M. White, London Hosp.

The following candidates, having completed the Final Examination, are granted the diploma of the Society entitling them to practise medicine, surgery, and midwifery: G. R. Germany, A. R. Madden, O. L. Matthews, R. Schauder, M. R. Tuteur-Samuel, and C. F. Williamson.

Scottish Conjoint Examining Board.

The final examinations of the Board of the Royal College of Physicians of Edinburgh, the Royal College of Surgeons of Edinburgh, and the Royal Faculty of Physicians and Surgeons of Glasgow, have just concluded at Edinburgh. Out of 91 candidates entered the following 29 have been granted the diplomas of L.R.C.P. Edin., L.R.C.S. Edin., L.R.F.P. & S. Glasg.:—

Genesis Ameratunga, Sirisena Petivagoda, T. F. Kirkpatrick, H. J. Smith, H. T. Anthonisz, T. A. M. Ashforth, G. L. Whitton, C. F. W. de Saram, B. A. Armitage, M. W. Joseph, L. J. Goggins, R. J. F. L. Talbot, C. M. Douglas, G. W. Puvimanasinghem, S. R. Iyengar, Samuel Grasse, F. A. Ebert, A. M. C. Stephenson, I. M. Sclare, J. A. Walsh, Wilfred Kelly, Maxwell Smellie, S. V. Rajah, M. E. Rubin, A. G. Williams, G. D. Morgan, P. A. V. Pillai, H. F. Ezzat, and Simon Freeman.

Paddington Green Children's Hospital.

The Duke of Connaught last week opened a new convalescent home at Lightwater, near Bagshot, for this hospital. It has cost £5000.

King's College Hospital Dinner.

The annual dinner of past and present students will be held at the Connaught Rooms on Thursday, Oct. 1st, with Mr. L. Vernon Cargill in the chair.

London (R.F.H.) School of Medicine for Women.

Sir John Simon will deliver the inaugural address of the session and present the prizes at the London (Royal Free Hospital) School of Medicine for Women on Oct. 1st, at 3 P.M.

Paddington Medical Society.

A meeting will be held on Tuesday, August 11th, at the Great Western Royal Hotel, Paddington, at 9 P.M. Dr. A. Baldie, vice-president of the society, will give an address entitled the Alcohol Problem.

Donations and Bequests.

The late Prof. W. D. Halliburton left, on the death of his wife, £10,000 to the University of London, King's College, for endowment or towards the salary of a professor in the subject of physiology or the sciences relating thereto.

New Mental Hospitals.

Two new mental hospitals, each costing half a million, are projected, one for Staffordshire and the other a joint institution for the Boroughs of East Ham and Southend-on-Sea. The Staffordshire mental hospitals board has decided to build a hospital for 700 and ultimately for 1000 patients. The existing three asylums are deficient in accommodation by 341 patients and in addition 165 patients are boarded out in other institutions; moreover, the board anticipate an increase of 74 patients annually for the next three years, which will bring the total deficiency to over 700. The East Ham-Southend scheme, which has been passed by the Southend town council, provides for a joint institution of 850 beds (500 for East Ham and 350 for Southend), with ultimate accommodation for 1050, with administrative blocks adequate for a hospital of the latter size. The selected site, which has been approved by the Board of Control, is Runwell Hill Farm, of just over 500 acres, near Wickford, a few miles from Southend.

Fellowship of Medicine and Post-Graduate Medical Association.

The Fellowship has arranged two special courses for August—namely, one in urology, now in progress at the All Saints' Hospital until the 29th (afternoons and some evenings), and one at the Queen's Hospital for Children from the 17th to 29th (all day). A comprehensive course will be given at the Brompton Hospital from Sept. 7th to 12th, and an afternoon course at the Infants Hospital from the 14th to 26th. There will be a course in psychological medicine at the Bethlem Royal Hospital from Sept. 8th to Oct. 3rd, and one in ophthalmology at the Central London Ophthalmic Hospital from Sept. 15th to Oct 10th. Revision courses will be held at the Westminster Hospital from Sept. 14th to 26th, and at the Metropolitan Hospital from Sept. 28th to Oct. 10th. Syllabuses may be had from the Fellowship at 1, Wimpole-street, London, W. 1.

Royal Medical Benevolent Fund.

At the last meeting of the committee 20 grants were voted, amounting to £689. The following are particulars of a few cases helped:—

Widow, aged 37, of M.B., who died in March, 1931, at the age of 37, leaving his widow only a capital sum of £600 and an infant of 3 years old. A medical man in recommending wrote: "I can think of no case which more deserves the sympathetic consideration and support of the committee." Voted £30. Personal touch with the applicant will be maintained, and further help or advice will be given if possible.

M.R.C.S., aged 74. Widower. For several years has suffered from paralysis agitans, and is very feeble. Applicant writes: "I have been unable to attend my patients and many have fallen off. I am quite unable to do anything for myself, and have to employ a male attendant to dress and undress me and to attend to me during the night, and I also require assistance to move about the house." Assured private income £68; friends give some help. Voted £40.

M.B., aged 40, wife aged 31, and a daughter 10. Applicant has had to give up practice and is in hospital with sarcoma in the hip. Wife and child are living on proceeds of sale of the practice, thereby using up the only capital. Voted £40.

Widow, aged 73, of L.R.C.P., who died at the age of 75 in March, 1931. The widow's only income is the old age pension of £26. Voted £26.

Cheques should be forwarded to the honorary treasurer of the Fund, 11 Chandos-street, Cavendish-square, London, W.1.

INDEX TO "THE LANCET," VOL. I., 1931.

THE Index and Title-page to Vol. I., 1931, which was completed with the issue of June 27th, is now ready. A copy will be sent gratis to subscribers on receipt of a post-card addressed to the Manager of THE LANCET, 7, Adam-street, Adelphi, W.C.2. Subscribers who have not already indicated their desire to receive Indexes regularly as published should do so now.

THE SERVICES

ROYAL NAVAL MEDICAL SERVICE.

THE following appointments are notified: Surg.-Comdrs. R. W. Nesbit to *Lucia*, T. J. O'Riordan to *Defiance*, and L. R. Warburton to *Victory*, for Haslar Hospital. Surg. Lt.-Comdr. (D.), E. R. Longhurst to *Victory*, for R.N. Barracks, Portsmouth. Surg. Lt. (D.), H. V. Pell to *Victory*, for R.N. Barracks, Portsmouth.

ROYAL NAVAL VOLUNTEER RESERVE.

Surg. Lt. R. R. B. Roberts to be Surg. Lt.-Comdr.
Proby. Surg. Sub-Lt. R. G. Reid to be Surg. Sub-Lt.

ROYAL ARMY MEDICAL CORPS.

The undermentioned Majs. are placed on retd. pay: A. M. Benett, W. Stewart, and C. W. Bowle (and is granted the rank of Lt.-Col.).

The undermentioned Lts. to be Capts.: P. J. L. Capon, K. McNeil, P. Dwyer, and W. H. Scriven (and remains secd.).

Maj. H. S. Blackmore retires on retd. pay.

Capt. J. C. Gilroy is granted the local rank of Maj. whilst empld. with the Trans-Jordan Fron. Force.

W. R. M. Drew to be Lt. (on prob.).

ARMY DENTAL CORPS.

Capt. J. L. Craig, half-pay list, is restd. to the estabt.

TERRITORIAL ARMY.

Maj. R. B. Rutherford resigns his commn. and retains his rank, with permission to wear the prescribed uniform.

Lts. J. G. Graham, W. H. Marston, and G. T. Hankey to be Capts.

J. C. Anderson (late Surg. Sub-Lt., R.N.V.R.), A. G. Emslie (late Offr. Cadet, Aberdeen Univ. Contgt., Sen. Div., O.T.C.), and J. J. McEnery to be Lts.

TERRITORIAL ARMY RESERVE OF OFFICERS.

Lt. D. N. Buchanan, from Active List, to be Lt.

INDIAN MEDICAL SERVICE.

Lt.-Col. J. P. Cameron to be Col.

Capt. G. H. Fraser to be Maj.

The undermentioned appts. are made: To be Lts. (T.C.): Tirath Ram Pahwa, Mohammad Abdul Gaffar, Jagan Nath Vasudeva, Mohammad Hafizuddin, Chintaman Narsinha Chandrachud, Kolluru Venkata Rayudu Choudari, Mohammad Ata-Ullah, Sundar Singh Ahluwalia, Man Singh, and Papatla Pattabhiramaiya.

Lt.-Col. F. P. Warwick retires.

Lt. R. A. Paton resigns his commission.

DEATHS IN THE SERVICES.

Col. John Archibald Hamilton, C.M.G., I.M.S., retd., died at a nursing home in Bath on July 29th in the sixty-second year of his age. He graduated in medicine and surgery in 1892 at the University of Edinburgh, and for a time was demonstrator of anatomy in the Medical School and Resident Physician in the University wards of the Royal Infirmary. In 1895 he joined the Indian Medical Service, and in 1900 saw service in China, where he was at the relief of Pekin (medal with clasp). He also served in the late European war, and was mentioned in despatches, receiving the C.M.G. in 1916.

A CITY OF LONDON BED.—The Corporation of London, at a cost of £1000, has endowed a bed in the City of London ward of St. Thomas' Hospital.

Medical Diary

Information to be included in this column should reach us in proper form on Tuesday, and cannot appear if it reaches us later than the first post on Wednesday morning

LECTURES, ADDRESSES, DEMONSTRATIONS, &c.

ST. MARK'S HOSPITAL, City-road, E.C.

THURSDAY, August 13th.—4.30 P.M., Dr. C. Dukes: Recent Advances in the Pathology of Intestinal Ulceration

Appointments

PHILLIPS, G. S., L.R.C.P. Lond., M.R.C.S., has been appointed Certifying Surgeon under the Factory and Workshop Acts for Brynamman, Carmarthen.

STORRS, K. S., M.B., Ch.B. Camb., a Medical Referee under the Workmen's Compensation Act for Brentwood, &c. County Courts, Circuit 33.

Honorary Consultants (Board of Control) Rampton State Institution:—HALL, A. J., M.D. Camb., F.R.C.S. Eng. (Encephalitis lethargica); TOWNROW, V., M.B. Lond., F.R.C.S. Eng. (Diseases of the ear, nose, and throat); and MACKIE, E. G., M.B., Ch.B. St. And. (Ophthalmic diseases).

Vacancies

For further information refer to the advertisement columns.

Barnstaple, North Devon Infirmary.—Res. M.O. £150.
Bedford County Hospital.—Asst. H.S. At rate of £130.
Birkenhead Infirmary and Institution, Tranmere.—Res. Asst. Med. Supt. £450.
Birmingham and Midland Eye Hospital, Church-street.—H.S. £110.
Birmingham, St. Chad's Hospital.—Res. M.O. £100.
Bolton County Borough.—M.O.H. £1200. Also Deputy M.O.H., &c. £750.
Bradford, City.—Asst. School Dental Surg. £475.
Bradford, Municipal General Hospital, St. Luke's.—H.P.'s. and H.S.'s. Each at rate of £200.
Bristol City and County of.—Asst. M.O.H. £500.
British Medical Association.—Scottish Medical Secretary. £950.
Cambridge, Addenbrooke's Hospital.—H.P. At rate of £130.
Cancer Hospital, Fulham-road, S.W.—Physiological Chemist. £600.
Carlisle, Cumberland Infirmary.—H.P., Second H.S. Also H.S. to Special Depts. Each at rate of £155.
Carmarthen, Joint Counties Mental Hospital.—Jun. Asst. M.O. £350.
Derby, Derbyshire Royal Infirmary.—Ophth. H.S. £150.
Dewsbury County Borough.—Deputy School M.O., &c. £600.
Doncaster Royal Infirmary.—H.P. At rate of £175.
Dudley, Guest Hospital.—Asst. H.S. £170.
Elizabeth Garrett Anderson Hospital, Euston-road.—Clin. Assts.
General Lying-in Hospital, York-road, Lambeth, S.E.—Res. Med. and Anæsthestist. At rate of £100.
Gloucestershire Royal Infirmary and Eye Institution.—H.P. At rate of £150.
Great Yarmouth General Hospital.—H.S. £140.
Guildford, Royal Surrey County Hospital.—Res. Med. and Surg. O. and Reg. £250.
Hackney Hospital, 230, High-street, Homerton, E.—Asst. M.O. £350.
Hampshire County Council.—Asst. County M.O. £600.
Hospital for Children, Hackney Road, E.—Cas. O. At rate of £100.
Hove, Lady Chichester Hospital.—Jun. H.P. At rate of £50.
Huddersfield Royal Infirmary.—H.S. At rate of £150.
Ipswich, East Suffolk and Ipswich Hospital.—4 H.S.'s and 1 H.P. Each £120.
Liverpool, David Lewis Northern Hospital.—Two Surg. Tutors and Regs. One Med. Tutor and Reg. Each £175.
Liverpool Heart Hospital.—Hon. Asst. Phys.
London University, S.W.—University Readership in Pathology. £800.
Maidenhead Hospital, Berkshire.—Res. Med. Officer. At rate of £150.
Maidstone, Kent County Ophthalmic and Aural Hospital.—H.S. £200.
Maidstone, Medway Institution Hospital.—Res. Asst. M.O. £200.
Maidstone, Pembury Institution Hospital.—Res. Asst. M.O. £200.
Maidstone, West Kent General Hospital.—H.S. £220.
Manchester, Ancoats Hospital.—Asst. Pathologist (Part-time). £200.
Manchester and Salford Hospital for Skin Diseases.—H.S. At rate of £100.
Manchester Royal Eye Hospital.—Jun. H.S. £120.
Manchester Royal Infirmary.—Clin. Asst. in Aural Out-patient Dept. £35.
Margate Royal Sea Bathing Hospital for Surgical Tuberculosis.—H.S. At rate of £200.
Margate and District General Hospital.—Res. M.O. £125.
Monkton Combe School, Somerset.—M.O.
Newcastle General Hospital, Newcastle-upon-Tyne.—Three H.S.'s. Each at rate of £150.
Nottingham and Midland Eye Infirmary.—Res. H.S. £200.
Nottingham Children's Hospital.—Res. H.S. At rate of £150.
Nottingham General Hospital.—Cas. O. At rate of £200.
Poplar, Metropolitan Borough of.—Asst. Tub. Officer, &c. £550.
Portsmouth, Royal Hospital.—Sen. H.S. £175. H.P. and Two H.S.'s. Each £130. Also Cas. O. £100.
Preston and County of Lancaster Royal Infirmary.—Res. Surg. O. £300.
Queen's Hospital for Children, Hackney-road, E.—Cas. O. At rate of £100.
Rotherham Hospital.—Sen. H.S. £200. Cas. H.S. £150. Also H.P. £180.
Royal Northern Hospital, Holloway, N.—Obstet. H.S. At rate of £70.
St. Leonards-on-Sea, Buchanan Hospital.—Jun. H.S. £125.
Salford, Hope Hospital.—Res. M.O. £400.
Sheffield, Jessop Hospital for Women.—Asst. H.S. £100.
Sheffield Royal Hospital.—Ophth. H.S. Also Anæsthetist. £120 and £80 respectively.
Sheffield Royal Infirmary.—Asst. Aural and Ophth. H.S. and H.S. and Second Asst. Cas. O. Each at rate of £80.
South London Hospital for Women, Clapham Common, S.W.—H.S. At rate of £100.
Southampton Free Eye Hospital.—H.S. £150.
Swansea General and Eye Hospital.—H.P. £150.
Tilbury, Hospital, Essex.—H.S. At rate of £150.
Tunbridge Wells and Counties General Hospital.—H.S. £160
University of London.—William Julius Mickle Fellowship. £300.
Walsall General Hospital.—H.P. and H.S. Each at rate of £150
West Bromwich and District General Hospital.—H.S., H.P., and Cas. H.S. Each at rate of £200.
Westminster Hospital, Broad Sanctuary, S.W.—Wander Scholar and Reg. to Children's Dept. £250.
Winchester, Royal Hampshire County Hospital.—Second H.S. At rate of £100.
Wolverhampton and Midland Counties Eye Infirmary.—H.S. £150.
Woolwich and District War Memorial Hospital, Shooters Hill, S.E.—H.S. At rate of £100.

Births, Marriages, and Deaths

BIRTHS.

SHAW.—On August 3rd, at a nursing home, the wife of Maurice E. Shaw, M.D., of Wimpole-street, and Addison-avenue, London, W., of a daughter.

WEAVER-ADAMS.—On July 28th, at Twyford House, Slough, the wife of E. R. Weaver-Adams, M.B., of a son (stillborn).

MARRIAGES.

EYTON-JONES—TUDOR.—On August 1st at Holy Trinity, Paddington, Frederick M. M. Eyton-Jones, M.D., M.R.C.P., D.P.H., to Sally, second daughter of the late Sir Daniel Tudor, K.C., Chief Justice of Gibraltar, and the late Lady Tudor.

GERRARD—MANNASSI.—On August 1st, at St. Catherine's Church, Liverpool, Wallace Worth Gerrard, M.B., Ch.B., eldest son of Mrs. and Mrs. L. V. Gerrard, of Southport, to Millicent Mannassi, B.A., eldest daughter of Mr. and Mrs. B. Mannassi, of Liverpool.

LANGDON BROWN—HURRY.—On August 1st, 1931, at St. Mary's Church, Bryanston-square, London, by the Rev. W. Yorke Batley, M.C., Walter Langdon Brown, M.D., F.R.C.P., 31, Cavendish-square, W.1, to Freda, only child of Mr. and Mrs. Henry Bishop Hurry, formerly of Sledgehirn, Eye, Northamptonshire.

DEATHS.

HAMILTON.—On July 29th, at a nursing home in Bath, John Archibald Hamilton, C.M.G., F.R.C.S.E., Colonel, Indian Medical Service (retired), of "Springwood," Lansdown, Bath, aged 61.

MUNDY-COX.—On July 31st, at an Edgbaston nursing home, Walter Mundy-Cox, M.C., M.R.C.S., L.R.C.P., aged 63.

NANKIVELL.—On July 29th, in the Middlesex Hospital, London, Bertram Wright Nankivell, M.R.C.S., of West Cliff-road, Bournemouth, aged 60.

WINDLEY.—On August 3rd, at Ruddington, William Windley, M.A. Camb., M.R.C.S., formerly of Colston Bassett, aged 71.

N.B.—A fee of 7s. 6d. is charged for the insertion of Notices of Births, Marriages and Deaths.

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NOTES, COMMENTS, AND ABSTRACTS

HEALTH IN WEST AFRICA.

THE latest vital statistics [1] of non-native officials in West Africa (comprising Gambia, Sierra Leone, Gold Coast, and Nigeria) show that the average number in the service has risen continuously from about 1200 in 1903 to over 4000 in 1930. At the same time the crude death-rate has fallen from 20 to 5·3 per 1000, the lowest point yet reached. The "invaliding"-rate shows a similar fall from 65 per 1000 in 1903 to 11 per 1000 in 1930. Of the 23 deaths in 1930 very few were due directly to tropical diseases, while of the 49 cases of invaliding five are attributed to malaria and one to blackwater fever. The largest group, numbering 11, are classified as neurasthenia, and the figures suggest that the risk of mental breakdown exceeds the risk of physical disablement from diseases peculiar to the tropics, and the environmental problems involved deserve attention. The form of the report has been somewhat altered from that of previous years. The data are now given separately for male and female officers, and new comparative tables have been introduced summarising the rates per 1000 of deaths and invalidings in each of the four territories over a period of 20 years. The difficulty in interpreting these tables, and in using the information relating to females, lies in the small numbers of persons involved. The improvement that has taken place in each territory and in the area as a whole would be far more clearly seen if standardised death-rates could be incorporated. The crude rates, however, suggest a vast improvement in the health conditions of the service during the last quarter of a century.

DIPHTHERIA IN A PARIS HOSPITAL.

IN a recent communication to the Academy of Medicine at Paris, Dr. B. Weill-Hallé [2] recorded his observations on diphtheria at the Hôpital des Enfants Malades in 1929 and 1930. A total of 1210 cases of diphtheria were admitted to the special pavilion at this hospital during this period, and 131 were fatal—a mortality of 10·8 per cent. Ninety-three deaths occurred among 1054 cases of faucial diphtheria (8·7 per cent. mortality), 31 deaths among the laryngeal or laryngo-tracheo-brachial cases (22 per cent.), and there were 7 deaths among 28 cases of paralysis. The mortality was almost the same in each of the two years, being 11 per cent. in 1929 and 10·6 per cent. in 1930. Comparing these figures with those which he reported from the same hospital in 1903, when he was Prof. Marfan's house physician, he shows that there has been a considerable fall in the incidence of diphtheria—mainly, he says, as the result of active immunisation—though the number of severe cases still remains high. This severity he attributes to various causes, such as virulence of the organisms, delay in diagnosis and specific treatment, association with seasonal infections and a special constitution, especially latent congenital syphilis. Although the treatment was the same in the two periods, the present dose of antitoxin was three to four times the amount used in 1901–02. He therefore concludes that diphtheria in 1929–30 was a less fatal disease than in 1901–02 and that diphtheria antitoxin had by no means lost any of its efficacy as some maintained. His present practice is to give an intramuscular injection of antitoxin on admission to hospital in order to neutralise the circulating toxin and at the same time to give a subcutaneous injection which is more slowly absorbed but continues to exercise its antitoxic effect during the following days. In apparently hopeless cases an intravenous injection is given half an hour after the other two injections, and during the next four or five days small doses of antitoxin are administered by the subcutaneous and intramuscular routes.

[1] West Africa: Vital Statistics of Non-native Officials. Returns for 1930. Published by the Crown Agents for the Colonies, Millbank, London, S.W. Pp. 7. 6*d*.

[2] Bull. de l'Acad. de Méd., 1931, CV., 971.

THE LIGHTING OF OFFICES.

WE noted last week (p. 258) some recommendations of the Council of the Illuminating Engineering Society on the lighting of schools and libraries. A pamphlet on the daylight illumination required in offices is published by the Department of Scientific and Industrial Research.[1] It might be thought that the adequacy of the natural lighting at any point in a room would depend solely upon the actual illumination at that point, so that a room which might seem light enough on a bright day would seem inadequately lighted on a dull day. Some time ago evidence was obtained that this is not so, but that, over a wide range of actual illumination values, the adequacy or inadequacy of the lighting at any given point is closely correlated with the daylight factor at that point. To study this point a "jury" of observers, including architects, illuminating engineers, and others, visited certain rooms in Whitehall and judged the adequacy of the lighting in different parts of the room. The result of the work was the conclusion that lighting in an office is adequate when the daylight factor equals or exceeds 0·2 per cent.—i.e., a sill ratio of 0·4 per cent. This is exactly the figure taken as a minimum of adequate lighting by the committee whose report was noticed last week.

GREAT MEN IN PUBLIC HEALTH.

YET another book [2] inspired by the names of the great sanitarians inscribed on the façade of the new School of Hygiene in Gower-street. There is, perhaps, more to be said than appears at first sight for such institutions giving on busy, noisy streets. Dr. Tobey does not restrict himself (as did M. E. M. Walker in his "Pioneers of Public Health" [3]) to the 21 selected heroes. He ranges over the whole history of public health, and writes accurately and interestingly of the progress of sanitary science from Moses to Gorgas and after. He goes to some extent off the track, which has been beaten pretty hard in recent years, and those who are a little bored with Lister, Pasteur, and Florence Nightingale can turn for refreshment to the chapters on W. T. Sedgwick, Trudeau, and the mental hygienists. The book is beautifully produced (except for the binding).

ERRATA.—In a report of a paper read before the Section of Pathology of the British Medical Association on July 22nd (p. 247) Dr. G. Roche Lynch is credited with a statement that "the employment of a non-medical analyst seriously embarrassed the work of highly skilled men." This misrepresents his meaning; for the point he wished to make was that faulty observation by the medical man at the post-mortem seriously embarrasses the work of the non-medical analyst.

In an annotation, entitled Sympathetic Ganglion Lesions in Scleroderma, which appeared on p. 255 of our last issue, the name of Dr. Geoffrey Rake was incorrectly given. Dr. Rake, who was formerly resident at Guy's Hospital, is at present working at the Rockefeller Institute in New York.

[1] Illumination Research Technical Paper, No. 12. H.M. Stationery Office. 1931. Pp. 10. 3*d*.

[2] Riders of the Plagues: the Story of the Conquest of Disease. By J. A. Tobey, Dr.P.H. New York: Scribner. 1930. Pp. 348. 9 plates. 12*s*. 6*d*.

See THE LANCET, 1930 ii., 671